

The Rules of Reading

For Academic Studying, Academic Analysis and Study Skills Technical Course

Question Everything, Learn Something, Answer Nothing: Euripides

Always Question everything for you never know what answers you will Find.

Always Questions everything. Use 5W and 1H

*“Everything was done to try and learn how to become a better basketball player. Everything. So when you have the point of view then literally the world becomes your library to help you become better at your craft... because you know what you want the world is giving you the information 100% because you know what you’re looking for.” **Kobe Bryant***

Once you know what it is in life that you want to do, then the world basically becomes your library. Everything you view, you can view from that perspective, which makes everything a learning asset for you.

Never Take Shortcuts that affect negatively my work quality. Take shortcuts that increase productivity, but not affect my work Quality.

Volume 21A

Do Fewer Things: Prioritize a limited number of significant tasks to reduce overload and enhance focus.

Work at a Natural Pace: Align your work rhythm with natural cycles, avoiding the pitfalls of constant urgency.

Obsess Over Quality: Commit to excellence in your endeavors, even if it means

Cal Newport

Prefer to Do Your Own Research, rather ask Artificial Intelligence (AI). Artificial intelligence can be useful for Geographical facts. But, when it comes to serious research, you should not use it. If you are not expert on the topic, then simply do not comment without proper Research. **William Lane Craig**

Brain Like Muscle, The Harder You Use, The Stronger it Becomes.

“If You Don’t Read Newspaper You are uninformed. If You Do Read It You Are Misinformed. What are the Responsibilities The Reporter Has? The Responsibility Of Reporter Is To Tell The Truth, Not Just To Be First, But To Tell The Truth. We Living In The Society, Where Just First Is Priority, who Cares, Just Get It Out There, Do Not Care Who Would It Hurts, Do Not Care Who Would Destroy, Do Not Care If It Is True, Just Say It And Sell It.” **Denzel Washington**

If you want your name to be remembered after your death, either do things worth writing, or write things worth reading.” - **Benjamin Franklin.**

If You Don’t Produce You Won’t Thrive – No Matter How Skilled Or Talented You Are. Human beings, it seems, are at their best when immersed deeply in something challenging. If you service low-impact activities, therefore, you're taking away time you could be spending on higher-impact activities. Two Core Abilities for Thriving in the New Economy

1. *The ability to quickly master hard things.*
2. *The ability to produce at an elite level, in terms of both quality and speed.*

Cal Newport.

ALWAYS TO Remember

$$T \text{ (Time)} + E \text{ (Effort)} + RS \text{ (The Right Strategies)} = \text{Success}$$

Pseudo Work VS Deep Work

Formula: Deep Work/ Work Accomplished = Time Spent x Intensity Of Focus

In the context of **Cal Newport's** work—especially from his book "**Deep Work: Rules for Focused Success in a Distracted World**"—**pseudo work** refers to activities that feel productive but don't produce meaningful or valuable results. They **mimic real work** without contributing substantially to your goals or success.

Key Characteristics of Pseudo Work:

1. **Shallow Tasks:** Tasks that are low in cognitive demand and often performed while distracted. Examples include responding to emails, attending unnecessary meetings, or tweaking presentations endlessly.
2. **Busy but Not Productive:** You may be very busy and active, but not actually making progress on important work.
3. **Work That Looks Good to Others:** Some pseudo work is done to appear productive to bosses or colleagues, like being active on Slack or showing up in all meetings.
4. **Reactive, Not Proactive:** It often involves reacting to other people's demands (e.g., inboxes, pings) rather than initiating meaningful progress on your core priorities.

5. Pseudo-working” to describe this common approach to studying. The pseudo-worker looks and feels like someone who is working hard—he or she spends a long time in the library and is not afraid to push on late into the night—but, because of a lack of focus and concentration, doesn’t actually accomplish much. This bad habit is endemic on most college campuses. For example, at Dartmouth there was a section of the main library that was open twenty-four hours a day, and the students I used to see in there late at night huddled in groups, gulping coffee and griping about their hardships, were definitely pseudo-working. The roommate who flips through her chemistry notes on the couch while watching TV is pseudo-working. The guy who brings three meals, a blanket, and six-pack of Red Bull to the study lounge in preparation for an all-day paper-writing marathon is also pseudo-working. By placing themselves in distracting environments and insisting on working in long tedious stretches, these students are crippling their brain’s ability to think clearly and efficiently accomplish the task at hand. The result is fatigue headaches and lackluster outcomes.

Contrast with Deep Work:

- **Deep Work:** High-value, cognitively demanding tasks done in a state of focused concentration.
- **Pseudo Work:** Surface-level tasks that are easy to do but have little long-term payoff.

Examples of Pseudo Work:

- Constantly checking and replying to email.
- Participating in frequent, unfocused meetings.
- Spending hours organizing your to-do list rather than tackling it.
- Multitasking with shallow tasks instead of focusing deeply on one important thing.

◆ Types of Pseudo Work in Professional Settings

Pseudo Work	Why It's Pseudo	What to Do Instead
Constant email checking	Reactive, easy, doesn't create value	Batch email processing at fixed times
Attending every meeting	Many are status-based, not value-driven	Attend only meetings with clear goals
Keeping Slack/Teams always open	Interruptions destroy deep focus	Turn off pings during deep work blocks
Making busywork look impressive	Focus on looking productive instead of being productive	Track results/output, not time spent
Unplanned task switching	Reduces mental momentum	Use time blocking and finish one thing before another

Why It's a Problem

- **Mental residue:** Switching between shallow tasks and deep tasks creates "attention residue" that weakens focus.
- **Low ROI:** Time spent doesn't lead to meaningful accomplishments.
- **Addictive:** Pseudo work often feels easier and more comfortable than real thinking.

Common Student Pseudo Work Activities

Pseudo Work	Why It's Ineffective	Better Alternative
Highlighting everything	Passive, doesn't help memory	Use active recall or write questions
Rewriting notes repeatedly	Neat notes $\neq$ understanding	Summarize and quiz yourself
Group study sessions that turn into hangouts	Socializing > studying	Study alone, then teach others
Skimming readings without goals	No engagement or retention	Use question-evidence-conclusion method
Long cram sessions	Low focus, low retention	Use focused short sessions (e.g., Pomodoro)

Newport's Anti-Pseudo Work Methods (for Students)

- **Fixed-Schedule Productivity:** Stop working at a fixed hour, so you're forced to use time wisely.
- **Time Blocking:** Plan each hour with a specific task. Avoid vague "study time."
- **Start with the hardest task first:** Deep effort requires fresh energy.
- **Location-based focus:** Always do hard work in distraction-free environments.

WHY WE FALL INTO PSEUDO WORK

Reason	Explanation
Cognitive ease	It feels less mentally taxing, so we do it instead of hard work
Social validation	Others may reward "busyness," even if it's shallow
Lack of clarity	Without clear goals, people drift into low-value tasks
Fear of discomfort	Deep work is hard and demands emotional resilience
Digital addiction	Devices push notifications and multitasking, making focus harder

HOW TO SPOT PSEUDO WORK IN YOUR LIFE

Ask Yourself:

- Am I doing this because it's easy or comfortable?
- Does this task lead directly to an important result?
- Could I delegate or batch this?
- If I stopped doing this, would anyone notice?
- Is this helping me learn something or create something valuable?

ACTIONABLE SYSTEMS TO ESCAPE PSEUDO WORK

For Professionals:

- **Time block your workday:** Pre-plan deep and shallow blocks.
- **Set deep work goals weekly:** Focus on creating, solving, or building something hard.
- **Batch admin work:** Email, Slack, reports—group them in shallow blocks.
- **Ruthlessly eliminate meetings:** If a meeting doesn't have an agenda, decline or ask for clarity.

For Students:

- **Study with active recall:** Make flashcards, practice problems, teach others.
- **Keep study sessions short and intense:** Use a timer, e.g., 50-minute blocks.
- **Use the “Q/E/C” Method:**
 - **Q:** What is the question or concept?
 - **E:** What evidence explains it?
 - **C:** Can you form a clear conclusion?

Why It Matters:

Newport argues that **deep work is rare and valuable**, and pseudo work is a major barrier to achieving it. Many modern professionals spend their days in a haze of pseudo work, mistakenly believing they are accomplishing something important.

Characteristic of Learner

Auditory Learners

If you're an [auditory learner](#), you learn best by hearing information. Unlike the visual learner, you probably prefer to go to your class and listen to the lecture before you read the text chapter. Do you understand the text much more easily after you hear the professor's lecture? Reading difficult text passages out loud is also a good idea for the auditory learner. Discussing the course material, mumbling information as you read and study, asking and answering questions out loud, and listening to study notes on tape are some strategies that you may already use if your preferred learning style is auditory. You may find that you can actually "hear" the professor's lecture when you try to recall the specific point you need to answer a test question. Many new test-preparation and memory strategies that are designed for auditory learners are included

Kinesthetic Learner

If you're a [kinesthetic learner](#), you learn best by doing things. You prefer hands-on tasks that allow you to touch and feel. Try some of the strategies listed in Figure 1.2 now. Many of the strategies used by visual and auditory learners also appeal to kinesthetic learners. For example, in Chapter 9 you'll learn a strategy called [mapping](#)—creating visual diagrams or representations of written and oral information. Whereas the visual learner can recall the information from a concept map by seeing it, the kinesthetic learner will be able to remember it by the feel of how he or she created it. Kinesthetic learners also learn well from doing experiments, taking self-tests, or replicating the tasks they will later have to perform in the testing situation. Many auditory learners use flash cards to recite definitions or information about a topic. The kinesthetic learner also learns well from making up the flash cards as well as from the action of self-testing. In Chapter 10, you'll learn how to create study sheets, make up self-tests, construct models, and work problems in order to prepare for upcoming exams.

Integrated Learner

Although each of us has a preferred learning style, most of us learn information by using a combination of learning styles. In fact, some courses, assignments, or exams may require you to use one or more of your less preferred learning styles in order to complete the task. When you are forced to complete a hands-on activity, for example, you may find that using a kinesthetic approach is more successful. Even though it's not your best way to learn most material, it is the best way to learn that material. Although my preferred learning style is visual, I always call the computer help desk when I run into a problem with a computer program. The advantage for me is that the technical support personnel tell me how to fix my problem, and they stay on the line and assist me as I complete each of the steps on the computer. By using my two less preferred learning styles together, I learn better than by using my preferred style. Of course, using a computer program is a hands-on task, so actually completing the task on the computer is the best way to learn to do it. Even a student who is a visual learner will perform better on a rock-identification exam by going to the rock lab and identifying the rocks for practice. This kinesthetic activity is much more effective than simply looking at the pictures of the rocks and reading about their characteristics. As an auditory learner, you may prefer to recite material to learn it; however, you probably will also benefit from writing recall questions in the margin of your note page so that you can do that oral review. By using visual and kinesthetic strategies, you can make the best use of your auditory learning style. Using a combination of auditory, visual, and kinesthetic strategies will help you benefit from all the ways that you can learn information. As you learn about note-taking, text reading, and test-preparation strategies in later chapters, keep your preferred learning style in mind. However, the most successful students are often the ones who can use strategies that take advantage of all of the ways they learn or those who can switch styles depending on the demands of the course or the assignment.

Summary

Visual	Auditory	Kinesthetic
• Read and highlight your text. • Visualize pictures, charts, and diagrams. • Take modified-block notes. • Outline information. • Map information. • Create charts. • Read related material. • Edit your lecture notes. • Color code your notes and study sheets. • Write out steps in a process for solving math and science problems. • Create study sheets. • Write word and question cards. • Write self-test questions. • Write questions in the margin and underline the answers. • Create visual images to connect information to acronyms and acrostics. • Use the method of loci to recall information. • Take online tests.	• Read difficult passages out loud. • Recite the main points at the end of every headed section of the text. • Explain information out loud. • Discuss the text assignment or lecture material with a study partner or study group. • Tape the lectures from your most difficult class and play them again when you commute or do household chores. • Cover the details in your lecture notes and recite from the headings. • Recite out loud the answers to questions appearing in the margin or on word and question cards. • Teach the material to someone or something else. • Create a taped self-test and recite the answers before listening to the correct ones. • Explain the steps for solving math and science problems. • Create rhymes, poems, and songs to recall information.	• Take notes as you read your text assignments. • Predict questions in the margin at the end of each headed section. • Create word, question, and problem cards and practice them in groups of 10 or 15. • Make up puzzles or games (like Jeopardy or the Match game) to learn text and lecture material. • Practice labeling diagrams, recreating maps, and filling in charts to learn information for exams. • Construct diagrams, models, and problem cards to practice math and science material. • Make up self-tests in the same format as the actual test and take them. • Participate in study groups and review sessions. • Work problems. • Take end-of-chapter and online tests to prepare for exams. • Develop acronyms and acrostics to recall information and practice using them. • Take online tests.

Decide Which Learner Characteristic applies to me?

Find out whether the class is Non-technical course or Technical Course

Step 0a Go To Class

1. First things first: Always go to class! The importance of this rule cannot be overemphasized. It doesn't matter if your class meets at 6:00 A.M., at the top of the steepest hill on campus, on Saturday mornings—wake up, get dressed, and get to the lecture on time.
2. This is why class attendance is so important. Not because learning is power, or it's what your parents would want you do, but because it saves you time. If you attend class regularly, you will significantly cut down on the amount of studying required to score high grades. Don't make this negotiable. Even if you're tired, hung over, or extremely busy, find a way to make it there.

Step 0b Find out whether the class is Non-technical course or Technical Course

1. **Distinguish between Non-Technical Course and Technical Course**

Step 1 Take Smart Notes (Technical Course)

1. Gather the Right Materials

- **Prepare The Laptop for Note Taking:**

- I. Use Laptop for taking the Notes, as Students are typing faster than they are writing.
- II. Typing the notes, will help to record more points in more details. This increased details and readability will make it easier to study come in test time. However there is an exception to Laptop:
 - a. For math, science, economics, and engineering courses that are heavy on numbers and equations, pencil and paper are acceptable. Some people are comfortable approximating complicated mathematical symbols on their laptop, while others are not. If you fall into the latter category, don't worry about using a notebook; for a technical course, the difference between the two mediums is less important.
- III. If you don't have a laptop, then make sure you have one notebook for every class and a pen that you are comfortable with. Try to write clearly. You might even consider typing summaries of your notes at the end of each week. I sometimes followed this strategy in my pre-laptop days, and found that it saved me significant study time in the long run.
- IV. Before Class or in between class, open how to take notes for each method and decide which will be the most suitable for the class
- V. Open Note Taking Method, You will use.

2. Take Smart Notes in Technical Courses (Where's the Problem?)

- **List of Non-technical Course:**

- I. Mathematics
- II. Finance
- III. Science
- IV. Engineering
- V. Economics
- VI. Computer Science
- VII. Quantitative Social Science
- VIII.** Anything that does require frequent Mathematical Formulas.

- **The Key to Taking Notes in Technical course is to record as many sample problems as possible When you study, these sample problems will prove to be your most important resource. Accordingly, your entire focus in a technical class should be to write down, as faithfully as possible, the steady stream of examples provided by your professor.**

3. Evaluate Your Instructor's Teaching Styles

Many professors teach the way that they learn best; they use their preferred learning style. Professors who are auditory learners typically lecture and involve students in class discussions. Visual learners present material primarily through handouts, videos, and transparencies and by writing key information on the chalkboard. Kinesthetic learners often teach through demonstrations, class activities, experiments, and other hands-on methods.

Evaluate Your Instructors' Teaching Styles

Use the chart to evaluate three of your instructors' teaching styles. Check the appropriate space if your instructor uses any of these activities. Then count the check marks for visual, auditory, and kinesthetic activities to determine your instructors' preferred teaching styles. Do your instructors' teaching styles match your learning style?

Instructional Mode	Instructor's Name:	Instructor's Name:	Instructor's Name:
1. Lectures			
2. Writes on board			
3. Uses transparencies			
4. Shows videos			
5. Uses handouts			
6. Includes discussions			
7. Does experiments			
8. Does demonstrations			
9. Gives directions orally			
10. Gives directions in writing			
11. Uses group activities			
Instructor's preferred teaching style:			
Your preferred learning style:			

4. **Don't Read Your Assignments, but Do Keep Them Handy**

- Most technical courses have assigned reading. These readings are usually textbook chapters, and they typically focus on a specific technique or formula. **Don't do this reading.** It may sound blasphemous, but it's the reality of college-level technical courses: Very few students actually do the technical reading ahead of time. Why? Because the exact same material will be covered in class.
- If you don't understand a topic *after* it's presented by the professor, then you can go back and use the reading to help fill in the blanks. This ordering of events is much more efficient.
- Smart students follow the professor's examples with their textbook open. This significantly improves your understanding of the techniques the first time they are presented, and it helps sharpen your questions when you get lost. Make sure that you have your assigned reading material gathered and ready to go before class begins.

5. **Prioritize Your Note-taking**

- **Priority 1- Record the problem statement and answer.**
 - I. If you're in the middle of writing down steps when the professor gives the answer and moves on to the next problem, skip the rest of the steps, record the answer, and move on too. You can try to come back during a lull to fill in more of the steps (so leave space), but even if you don't, having only the problem and answer will still be useful for review later.
- **Priority 2- Question The Confusion:**
 - I. Students who do well in technical courses are those who closely follow the problems being presented and then insist on asking questions when they don't understand a specific step.
 - II. If you can't ask a question, then at least clearly mark where you got confused. Write a bunch of question marks or circle the line in your notes; this will help you later when you study. Remember, however, the more questions you get answered in class, the less legwork you will have to do later. So raise your hand, be confident, and ask away!

- **Priority 3- Record The steps of sample problem:**
 - I. The reality of technical courses is that the professor usually goes slow only on the first sample problem presented for a new technique. These are usually the only sample problems for which you can capture all of the steps. So pay particular attention at the beginning of the discussion, and don't get discouraged if subsequent problems fly by too fast for you to record all of the intermediate steps.

- **Priority 4- Annotate the steps**
 - I. If you get ahead of the professor on a given problem, and you have time to kill, annotate the steps with little explanations of what they accomplish or why they're important. In the cases where you do have time for these annotations, they will prove immensely useful when you review.

Step 2- Demote Your Assignment

1. Do No Spend Too much Time on Reading Assignments:

- Most students spend way too much time on reading assignments and problem sets, causing them to feel constantly overwhelmed by their work. This is a problem. If day-to-day assignments dominate your schedule, then there is no time left to prepare properly for the bigger exams and projects.
- Straight-A students hate excessive schoolwork just as much as the next student, which is why they have mastered the art of minimizing the time spent on assignments while still learning exactly what they need to know. This chapter details their strategies for powering through readings and problem sets with a minimum of stress.

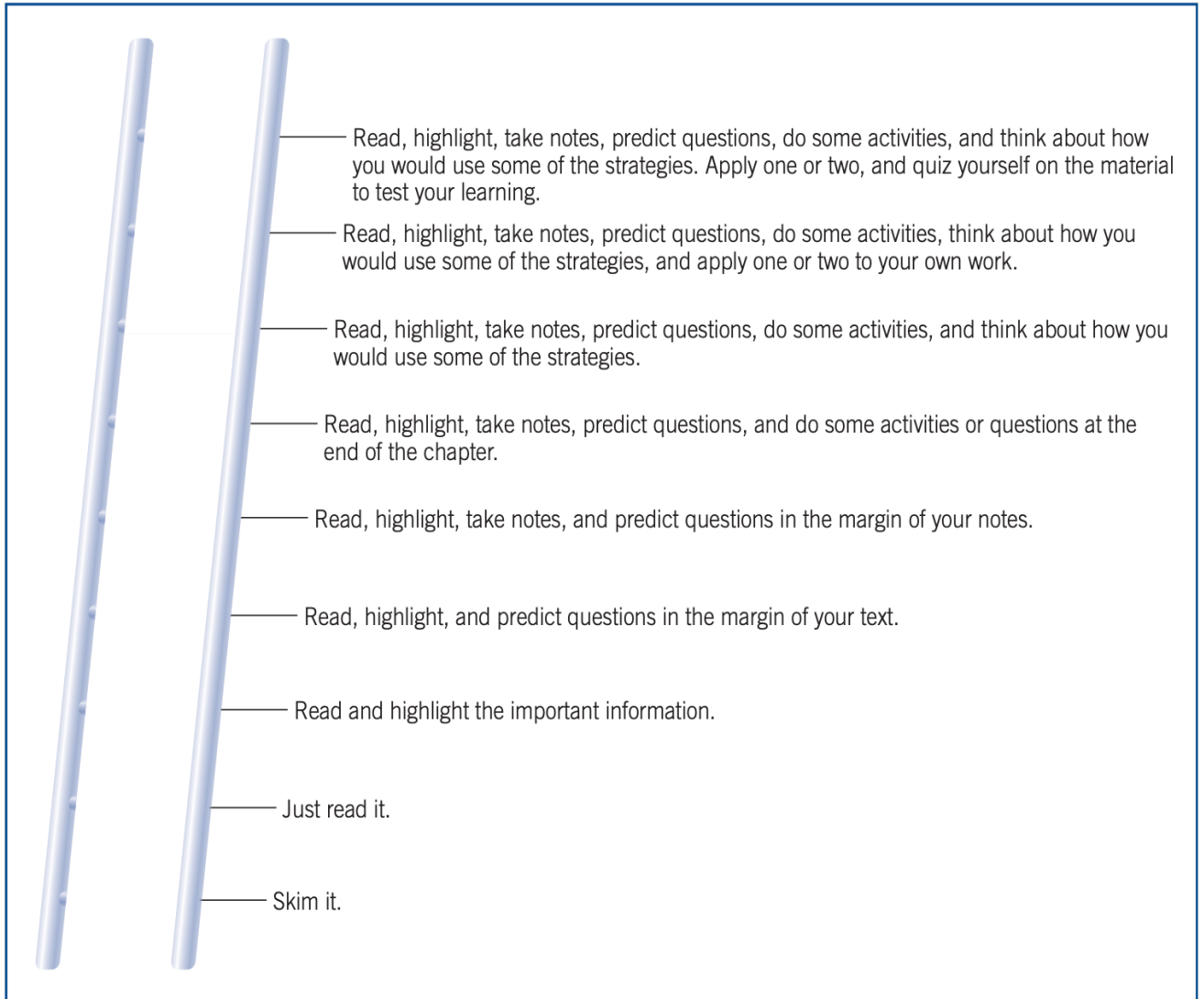
2. Work Constantly

- **Step 1- Never Start assignment until the day before it's due.**
 - I. **Large Assignment-** Large assignments will quickly transform from potentially interesting to tedious to painful when tackled in one monolithic, last-minute chunk of time. And, if two or more assignments happen to be due on the same day (which will happen often), you will be forced into a frenzied work marathon that will produce lackluster results at best.

- **Step 2- Work Constantly**
 - I. **Sit Every Sunday and plan out the week. The plan is to ensure that I would not have too much work on busy days and that I do at least a little bit each day.**
 - II. **Work Constantly on assignments, in small chunks, every day. This will help to ensure that I do not have too much work on busy days and that I do at least a little bit each day.**
 - a. For example, if you have a problem set due every week, complete one problem a day, one hour at a time. Don't spend five hours the night before.
 - b. The same goes for reading assignments—knock off a chapter a day, and you'll never find yourself spending a lonely night with a textbook and a six-pack of Red Bull.
 - c. Bear in mind that even if you get caught up on all of your assignments for a given class, you should continue to work. For example, if it's Sunday morning and you have already finished your reading for Monday's history class, and you have time to spare, break out a book and do a little of the reading for Wednesday's history class. This doesn't mean that you should study like crazy twenty-four hours a day. Don't stay up until 2 A.M. Sunday night trying to finish the entire week's load.
 - d. Straight-A students use this strategy whenever the opportunity presents itself, since getting ahead on class work frees up time to focus on big projects like paper writing or test preparation. It may seem superstitious, but easy weeks never seem to come in pairs. They're like the calm before a storm: If you find yourself with time to spare, start getting ahead on your obligations, as a hurricane of deadlines is probably lurking just over the horizon.

- **Step 3- Don't Read Everything.**

- I. **Use Rules of Reading Method To Read and Analyse Data.**
Use Rules of Reading Volume 4-29.. Decide The level of interaction:



II. Don't Do all of your reading- Don't read everything on the syllabus:

- a. It's important to triage (determine) your assignments:**
 - What do you need to read? Use Rules of Reading Method To Read and Analyse Data. Use Rules of Reading Volume 4-29.
 - What do you need to skim?
 - What can be skipped entirely
- b. It is impossible to read every single thing assigned to you in every class.**
- c. Decision Making-Decide what reading is important and what can be skipped**
 - Identify the exact level of importance of every assignment
- d. No Favourite Sources**
 - In a course with no favored sources, readings that directly address the specific topic of the lecture act as the favored sources for the day. Treat the rest as supplemental.

e. Favourited sources:

- **There are one or two sources that show up on the reading list for every lecture. They are usually textbook or course reader and they provide the basic structure for the course outlining key facts and arguments in condensed form**
 - **Lecture #4—The Quest for National Health Insurance: Clinton Health Care Plan**
 - **Reading:**
 - Enthoven, Alain. “Managed Competition: An Agenda for Action,” *Health Affairs* 7, no. 3 (Summer 1988): 25–47.
 - Eckholm, Erik. (1993) “Introduction,” in *The President’s Health Security Plan*. New York: Times Books, vii–xvi. ISBN:0812923863.
 - Skocpol, Theda. “The Rise and Demise of the Clinton Health Plan,” in *Health Affairs* 14, no. 1 (Spring 1995): 66–85.
 - Heclo, Hugh. “The Clinton Health Plan: Historical Perspective,” in *Health Affairs* 14, no. 1 (Spring 1995): 86–98.
 - Peterson, Mark A. (1998) “The Politics of Health Care Policy: Overreaching in an Age of Polarization,” in Margaret Weir, ed., *The Social Divide*. Washington, D.C.: Brookings Institution Press, 181–229.
 - What makes this example hard is that the course has no obvious favored sources. That is, there is no textbook or reader that shows up for every class. The key, in this situation, is to use the lecture title as a clue. The rule can be simply stated as follows: **In a course**

with no favored sources, readings that directly address the specific topic of the lecture act as the favored sources for the day. Treat the rest as supplemental. In this example, the lecture is titled The Quest for National Health Insurance: Clinton Health Care Plan. Therefore, the Erik Eckholm, Hugh Heclo, and Theda Skocpol assignments should become your favored sources, since all three deal directly with the Clinton health care agenda. You should read these carefully

- The two other articles are supplemental. Because they look like they contain arguments relevant to the topic of health care under Clinton, they fall at the top of our supplemental reading importance hierarchy, and, therefore, they demand enough attention to reveal their argument. A smart approach would be to read the introductions to both of these articles, and then take careful notes on their theses.

- **Always Read the assignments from favoured sources.**
 - **Use Rules of Reading Method To Read and Analyse Data. Use Rules of Reading Volume 4-29.**
 - Professors usually augment these favored sources with a variety of supplemental readings that provide context or analyze certain arguments and events in more detail. These supplemental readings are often academic papers, transcripts of speeches, or chapters from books—and they are typically fascinating. But they are also typically expendable, and you should not plan on reading them all. Instead, if your time is limited during a particular week, then your strategy should be to select only the most important supplemental readings for review.

- **Follow Simple Hierarchy of supplemental readings to review, which to skim and which to skip:**
 - **Use Rules of Reading Method To Read and Analyse Data. Use Rules of Reading Volume 4-29.**
 - **Review: Reading that Make an Argument are more important than readings that describe an event or person.** Assignments at the top of this hierarchy require at least enough attention to allow you to identify the argument being made. They don't have to be read as carefully as a favored source, but you should spend enough time with them to gain a good understanding of their theses.
 - **Skim: Readings that describe an event or person, which are more important than reading only provide context.** Assignments in the middle of the hierarchy merit skimming, since they introduce facts that can clarify relevant arguments. A quick pass through should highlight enough of these facts to be useful, and you certainly don't need to carefully review every detail.
 - **Skip: Reading that only provide context (speech transcripts, press clippings`) are least important reading.** Assignments at the bottom can usually be skipped, since professors will discuss what's important about them during class. Make sure, therefore, that you bring these readings to class and take careful notes.

f. Confirm Your Decision

- Use the lecture itself to confirm your choice about what to read and what to skip. If the professor emphasizes the importance of a work that you dismissed (which will happen occasionally—this system isn't perfect), then make a note that you will need to go back and cover this reading in more detail before the next exam. A smart technique is to simply write these skipped readings right onto your syllabus as an assignment for a later class.
- Choose a day with a light reading load, and treat the assignment as if it was given to you by your professor. If you don't explicitly schedule a time to cover this material, you will invariably procrastinate and then find yourself with a huge reading list to cover right before the exam.
- On the other hand, if you find your professor is discussing certain assignments in a lot of detail, then use this input to scale back how closely you are reading at home.

g. Take Smart Notes on your favoured Reading

Assignments

- First, as with lectures, try to take notes on your computer. They will be more organized and easier to follow later on, when you use them for review. In addition, typing makes it easier to record more and finish faster.
- In this situation, how you take notes on the reading makes a big difference. If you write down very little, the assignment can be completed fast, but the time will be wasted because you won't have bothered to extract the big ideas in a way that makes them accessible when it comes time to study. If, on the other hand, you take detailed notes on every paragraph, your assignments will take way too long to complete.
- **The exercise should take around 20-30 minutes**
 - A typical article or book chapter should fill, at most, a page of single-spaced notes and take no longer than twenty to thirty minutes to complete. If it takes you longer, then you're likely reading too slowly when you make your check marks. Don't be afraid to move quickly—if you understand the question and the conclusion, all you need is a sampling of the evidence that connects the two. As Matthew from Brown puts it, your goal should be to “read for arguments, not facts.”

- **At the Top Write Down the name of the Favourite source for Assignment:**
 - **Name of the Author**
 - **Name of The book**
 - **Name of the Chapter**
 - **Reference**

- **Write Down Questions:**
 - **Use Rules of Reading Method To Read and Analyse Data. Use Rules of Reading Volume 4-29.**
 - Next, carefully read the beginning of the assignment. Look for the question being answered by the author. Note that this is different than a thesis statement. For example, “Why did the Clinton health care plan fail?” is a question. “The Clinton health care plan failed because of resistance from commercial health care providers” is a thesis. In a reading assignment, the question can usually be found in the title or perhaps explained in the first few sentences. Record this in your notes, and label it clearly.
 - Each question should be associated with a well labelled question.
 - Your notes for a given lecture should consist only of a bunch of question/conclusion pairs, each separated by points of evidence that support why the conclusion is a reasonable answer to the question. In other words, your goal is to fit all the facts and observations spewed out during class into this nice simple structure.
 - Who?
 - What?
 - Where?
 - When?
 - Why?
 - How?

- **Use Rules of Reading Method To Read and Analyse Data. Use Rules of Reading Volume 4-29.**
- **Skim Reading:**
 - Now comes the easy part: Skim the entire reading. Don't take notes yet. Instead, use a pencil to make checkmarks next to important paragraphs that jump out at you. Because you are reading fast, you may miss some points—don't worry. "Just get the gist of the author's message and how he is supporting that message with evidence, then move on," explains Jason, a straight-A student from the University of Pennsylvania. You don't need to capture everything. Your goal is simply to mark a few solid examples that justify the conclusion as the answer to the question.
- **Write Down Evidence**
 - Once you have skimmed through the entire reading, go back and find your check marks. For each mark, record in your notes a concise summary of the corresponding point. Label each point in your notes with the page number where you found it. This shouldn't take long. Don't worry about being formal or grammatically correct. Just dump these pieces of evidence into your notes.
 - Logic
 - Deductive Logic Used
 - Inductive logic Used
 - Statements
 - Evidence

- **Write Down Conclusion**

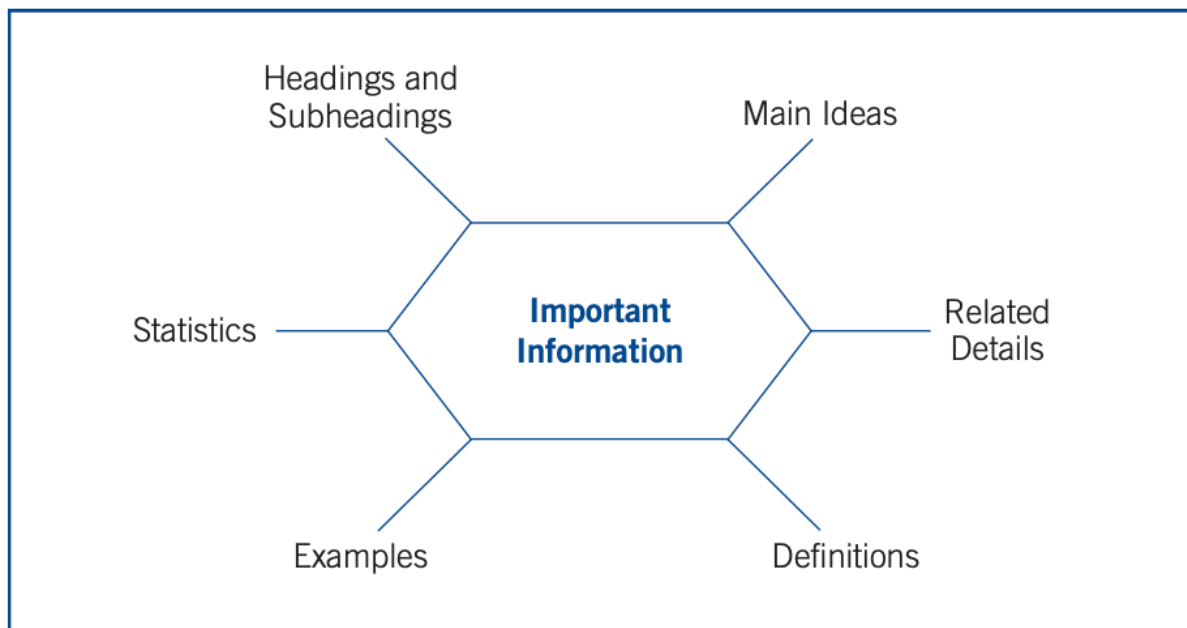
- Next, look for the author's conclusion (the thesis statement). This is perhaps the most difficult part, since academics are known to propose complicated answers to their questions, especially when writing. So it may take some serious consideration to figure out what's being suggested. Search the first few paragraphs; this is typically where the conclusion is hidden. Also check the final few paragraphs. Often a thesis is proposed at the beginning of an article but then refined slightly at the end once all of the supporting evidence has been presented. When you feel confident in your understanding of the conclusion, record it carefully in your notes. Don't worry if it takes several sentences to capture the point—err on the side of being thorough.
- When you're done, your notes should contain a clearly labeled question followed by a half-dozen or so bullet-pointed pieces of evidence, then a clearly labeled conclusion.

- Professors will sometimes hint at a conclusion but not come right out and present a neat endpoint for the current discussion. In this case, it will be up to you to synthesize the question, evidence, and professor's hints into a conclusion of your own. This is the important part. When you formulate a conclusion, you are cementing a big idea. If you can't finalize a conclusion before the professor moves on to the next question, simply jot down **Conclusion:** and plan to come back later during a lull in the lecture, or immediately following class, to fill in the blank.
- Conclusions are rarely simple. Professors often offer conclusions that only summarize the complexity of the issue. Consider, for example, the following question from a literature class: "Who was the greatest novelist of the twentieth century?" A simple conclusion might be: "Hemingway." And the evidence, in this case, might be several points highlighting the influence and originality of Hemingway's work. On the other hand, it's much more likely that a college professor would offer up a more complicated conclusion to this question, perhaps something like: "Different generations answered this question differently, depending on the prevailing social issues of their time." In this case, the evidence could be excerpts from scholars of various periods talking about their favorite novelists, as well as some

observations concerning the differing social climates during each of these eras.

- It's important to read over your notes right after class to absorb them and make corrections and additions, otherwise you'll be susceptible to entirely forgetting what was covered that day." These little moments and adjustments will make a big difference when it comes time to review.
- Summarize
- Add Illustrative Formatting

Mark Books



Mark Main Ideas

The second most important information to mark is the main idea statements. **Main ideas** are the general statements that the author makes about the topic. The main idea statement, or topic sentence, is generally found in the first or second sentence of a paragraph. Unfortunately, many students overlook these statements because they don't contain a specific fact or buzzword. Look back at the text selection in Activity 8-2. Which sentence in each of the paragraphs states the main idea? If you said the first sentence, you were right for paragraphs 1 and 2. You may be having a hard time finding the main idea sentence in paragraph 3. That's because paragraph 3 doesn't contain a **stated main idea**. Sometimes authors don't directly state the main ideas; they only imply them. The **implied** (unstated) **main idea** in paragraph 3 is that the oceans provide other important resources to Earth. You'll find that it doesn't take much practice to learn to pick out the main idea statements in most of your textbooks. When they are unstated, you can figure them out from the information given in the paragraph. Ask yourself: What point is the author making here? Rereading your text marking should help you identify the stated main idea or figure out the implied main idea.

Focus on Supporting Details

As you read and mark, you also should focus on definitions, examples, enumerations, facts and statistics, and signal words. Definitions are very important, and you'll need to understand what the technical terms in the chapter mean both to comprehend the text material and to answer test questions. You can highlight definitions as you read, or you may want to copy them onto index cards so that you can begin to learn them. Put the word on the front and the definition on the back, and then practice them out loud as you would with flash cards.

Examples are included in many textbooks because they help you understand abstract theories or concepts by bringing them down to a more concrete level. Examples are sometimes rather long and detailed or are set off in small print or in boxes, so students often view them as extraneous (outside or unrelated) information. However, examples can be critical to your understanding of the more abstract information in the text. You don't have to mark every word in the example; instead, mark just enough to see the connection between the example and the information to which it refers.

Lists or enumerations should always be marked. They may span several paragraphs or even several pages, but a main idea sentence will let you know what you should look for in a list. For example, the main idea sentence may state that there were three main adaptations that the vertebrates made. As you read, you should look for these adaptations so that you can mark all three.

Facts and statistics also are worth marking because they typically support the main ideas that the author is making and often end up on tests. Finally, it's important to mark signal words like *however*, *on the other hand*, and *but*. These **signal words** or transitions indicate that the author has shifted direction from positive to negative points or vice versa. Leaving them out can result in misinterpretations during later review.

HOW MUCH SHOULD YOU MARK?

Now that you have a good idea of what to mark, it's important to discuss how much you should mark. It may sound as though you'll need to mark everything on the page, but don't panic. Even when you mark all the important information in a section, you'll still be able to condense the material. Learning to mark the right amount of text material is critical to effective marking. You should mark enough information so that you'll be able to review for an exam without ever reading any of the unmarked text again.

Avoid Undermarking

Sometimes students don't really understand how to mark a textbook, and they end up **undermarking** (marking too little or too selectively) the text. **Marking too little** results when students mark only the important buzzwords in the text. However, without marking the related details, the marking lacks meaning during later review

(see sample 1 in Figure 8.6). Only the key words have been marked. Read only the highlighted information. Does this marking make sense? Has this student marked all the important information in the selection?

Another type of undermarking results from **marking too selectively**. Some students do mark meaningful phrases when they mark. However, they miss important information by trying to pick out only one or two important points in each paragraph or headed section. These students may be trying to follow rules for how much to mark; they may have heard or read that you should mark only one main point in each paragraph or that you shouldn't mark more than 20 percent of the words on a page. In sample 2 of Figure 8.6, the student marked only two pieces of information in the paragraph. Are these the only things you would have marked? Many students miss test questions, not because they don't study, but rather because their marking is too selective so they don't study *all* of the important information. Sample 3 contains a more accurate record of information.

Avoid Overmarking

Overmarking can be just as bad as undermarking. If you mark everything on a page or mark whole sentences, you aren't forcing yourself to think about the content of the material. Many times, overmarking is a signal that you're not reading actively. If you mark everything, you aren't actively involved in making decisions about what's

TIP**More Tips for Marking Your Text**

❑ **Mark your text.** Many students have difficulty writing in their textbooks. After years of being told not to write in books, it's difficult to actually do it. But it's an important strategy that saves time and improves your comprehension.

❑ **Avoid the used-book trap.** If at all possible, buy new texts for your classes. Many students who buy used texts rely on previous highlighting or notes that already exist in the text. It's very tempting, but it leads to passive reading. If you must buy used books, search for texts with little or no marking already in them.

❑ **Don't overlook "external" text material.** Some important information is found outside the regular body of the text. You need to read and mark any definitions for technical terms, even if they're in the left-hand margin. Don't omit information included in charts, graphs, and other diagrams. The information under photos, in footnotes, and in boxed features is also important to your understanding of the material.

❑ **Monitor your text marking.** You need to pause every so often (at the end of a paragraph, headed section, or page) and monitor your marking. If you look back and notice that you didn't mark anything or marked everything on the page, you probably need to go back and read it again. Your marking is a good indicator of whether or not you understood the material and your level of attention to it.

❑ **Re-mark used textbooks.** If you're forced to purchase a used textbook, you still should do your

own marking. If the text is highlighted in yellow, you could use blue. If it's underlined, you could highlight. What someone else marked may not be what your professor will test on. Would you rely on a stranger's lecture notes?

❑ **Mark math and science textbooks.** Box or highlight all formulas, as well as any problems that you want to review. Be sure you also mark the text material that explains or discusses that formula or problem. A lot of students ignore the prose material that's included in math and science texts. This material is as important as or perhaps even more important than the problems themselves.

❑ **Mark your literature books.** You can mark short stories, poetry, novels, and plays as you read. Instead of looking for main ideas and supporting details, look for lines that contain themes, major plot events, key information about the characters, examples of foreshadowing or irony, and so on. Marginal notes are especially effective for literary works.

❑ **Photocopy and mark outside readings.** Many professors assign reserved or library readings as part of the course material. Often one or two copies are available on reserve in the library for students to read. You may choose to read the articles and take notes on them. You could also copy them (if time on campus is tight) and highlight them as you read. Whatever you do, be sure to review the material before the exam.

Predict Questions

After you finish reading and marking your text chapter, go back and review the important information by predicting and writing questions in the margin. You can use these same questions to review for exams, of course, but they will provide you with an excellent way to reinforce and learn the information before you even walk into class for the lecture or a quiz.

There are four basic steps involved in predicting questions. First, go back and re-read the highlighted material for the first paragraph and identify an important point that you want to remember (see Step 1 in Figure 8.9). Next, turn it into a question and write it directly across from the information, in the margin of the textbook (see Step 2). Be sure you write questions that have stated answers in the text and not *yes* or *no* answers. Next, underline the answer to the question in your text (see Step 3). After you finish reading, go back and quiz yourself by covering the text material and reciting the answers from memory (Step 4).

The more questions that you write, the more repetition you get on the material and the more you can test your learning. It's a good idea to write both broad and narrow questions. Write a broad question for each heading or subheading and then as many specific questions as you can in the space available. If your text doesn't have wide margins, you can still use this strategy. Write the questions on a long strip of paper (about 3 inches wide), which you can line up with the top of the text page. Keep the question strip in the text on that page for later review (note the page number on each strip). You can also write each question on the front of an index card and the answer on the back (note the page number on the back, too).

You may find it helpful to use some of the innovations my students developed. You could write every other question in a different color (red then blue) and underline the answer with the same color. This helps separate your questions and their answers. You could also number each question and answer. Brittney wrote questions for her Educational Psychology course. If you look at the first sentence (see Figure 8.10), you'll notice that Brittney used part of the information that she highlighted to frame her question and then used the key information she wanted to remember as her answer. Because there was so much information in this section, Brittney felt that numbering her questions and answers would help keep the information more organized. If you have definitions or other material in the margin, you might want to put a post-it note over them and write your questions on top. That way you can lift the note and study the material underneath.

Predicting questions in the margin of your text provides you with at least three more interactions with the text material. You reread the highlighted material, think

Quick Reading

P2R	SQ3R	S-RUN-R
Preview	Survey	Survey
	Question	Read
Read Actively	Read	Underline
	Recite	Note Take
Review	Review	Review

The Three Steps in P2R

Preview. You should always preview a chapter before you read it. A **preview** is a brief overview of a chapter done before reading. Previewing takes very little time and effort—most students can do it in two to five minutes. The first thing to do is read the title of the chapter. Then read the introduction, outline, or structured overview (a visual display of key information) at the beginning of the chapter. If your text doesn't begin with an introduction, outline, or structured overview, read the first two paragraphs. As you turn the pages of the chapter, read the headings in bold print and glance at any pictures, tables, or graphs. Don't stop to read any of the text along the way. At the end of the chapter, read the summary or the last two paragraphs. If your text contains an extensive summary (a page or more in length), you may want to read only the first and last sentence of each of the paragraphs in the summary. If you're reading a journal article, essay, or other short selection, you may find it helpful to read the first sentence of each paragraph.

Read Actively. The second step of the P2R system is to **read actively**—to do something while you read. One way you can become an active reader is by marking your text. After you have read a paragraph or headed section of text, pause to think about what you've read. Go back and use a highlighter to mark any material that you think you'll want to review again before the exam. By highlighting the text, you're actively involved in thinking about the material, and you're condensing

what you'll need to review at a later time. Chapter 8 includes much more information on how to highlight.

Another way to read actively is to take notes. Taking notes on a text is a lot like taking notes on lectures. Write the heading in your notebook and then jot down the important details. More information on how to take text notes is given in Chapter 9. You could also write recall questions or summary statements in the margin of the text.

Review. After you complete a ten-page chunk of reading and at the end of the chapter, you need to **review**—do something to reinforce the important information. There are a number of ways that you can review the text material, but here are four of the most common ones. First, if you highlighted or took notes to read actively, write questions in the margin of your text or notes at the end of each ten-page chunk of the chapter. Then when you finish reading the entire chapter, recite the answers to your questions. Second, use the headings to recite the key information. Cover the details with your hand and recite using the headings as cues. Third, do the exercises or do the questions at the end of the chapter. Finally, you can take the end-of-chapter tests or online tests to review and monitor your learning. You don't need to use all of these strategies, but try them as you complete your reading assignments and find the ones that work best for you.

Advantages of the P2R Reading/Study System

The P2R reading/study system is a very efficient system for dealing with text material. By previewing, reading actively, and reviewing your text, you should be able to significantly increase your comprehension of the material. You may also find that it takes less time to read the chapter, increases interest, builds background to aid comprehension, and prepares your text for later review.

- **Builds Background.** Previewing the chapter provides you with some background about topics in the chapter that may be new to you. Even a brief overview of the chapter can help you pick up some general information about the material. You may also gain some understanding of how the information is organized and presented. Both of these kinds of information can help you understand the text material better. Research studies have shown that previewing before reading can increase your comprehension of the textbook chapter by 10 to 20 percent.
- **Reduces Reading Time.** Even though previewing appears to add a few additional minutes to your reading time, it probably will reduce the total time that it takes you to read the chapter. You can test this yourself. Select a chapter in one of your textbooks and time yourself as you read the chapter. Then select another chapter. This time, preview the chapter and then read it. Which chapter took more total reading time?
- **Increases Interest.** Many students also report that they get interested in a chapter because of their preview of it. This is especially true when students are reading texts that they find boring. As you preview, you may notice a particular topic in the middle or at the end of the chapter that seems quite interesting. Getting to that “good stuff” can motivate you to read the less interesting material.
- **Improves Comprehension.** Reviewing after you read each ten-page chunk helps you reinforce the important information. Without reviewing, you really can’t be sure that you did understand the text material or that you can recall it for a quiz

or class discussion. Reviewing provides you with an opportunity to move the information into long-term memory and test your learning. As you'll see in later chapters, there are many ways to review text material. A few of the most common ones are described in the next section. Even a five-minute review can increase your comprehension of the material.

- **Prepares Your Text for Later Review.** Marking your text or taking notes will aid your comprehension even more and prepare your text for later review. In recent years, there has been a great deal of discussion about the value of marking your textbook as you read. One view suggests that marking your textbook is a way to avoid learning the material as you read it. In some ways this is true. However, if you've already started college, you probably realize that you just don't have time to learn all of the material *well* the first time you read. The main reason for marking your text is to identify the important information and condense the text material so that you never have to read the entire chapter again. It is not unusual to have 300 pages of text to review for just one exam. Think about how long it would take to reread all of it. And, remember, rereading the text takes a lot of time and doesn't really help you learn the information for the exam. Highlighting or note taking allows you to keep up with your class assignments, identify and mark the material that you will need to study further, and improve your ability to concentrate, which increases your comprehension.

The SQ3R Reading/Study System

SQ3R, developed by Francis Robinson in 1941, is one of the most widely taught reading/study systems.² Many students learn how to use SQ3R in junior high school, in senior high school, or even in college. Have you ever been taught how to

The Five Steps in SQ3R

Survey. Survey the chapter before you read it. Go through the chapter quickly, glance at the headings, and then read the final paragraph of the chapter in order to get a general idea of what the chapter is about and the main points that the author is making.

Question. Before you begin to read the first headed section in your chapter, turn the heading into a question. How would you change the heading “Sensory Adaptation” into a question? Actually, you could generate a number of different questions. One of the most typical (though not necessarily the best) is “What is sensory adaptation?” Formulating questions forces you to think about what you’re about to read; it makes you try to predict what the author’s main point will be.

Read. Read the text material under the heading in order to find the answer to the question that you generated. Turning the heading into a question helps you focus your reading. Reading the section to locate the answer to your question helps you get actively involved in the text material. Read the text selection in Figure 7.6 to find the answer to the question “What is sensory adaptation?” (or whatever question you formulated in step 2, “Question”). As you read the selection, check to see if you can find the answer to your question.

Recite. At the end of the first headed section, recite the answer to the question that you formulated. Recite the answer in your own words, without looking at the text. If you find that you’re unable to recall part or all of the answer, glance over the section again. Then jot down a brief answer in outline form on a piece of paper. Don’t make any notes until you’ve read the entire section.

Review. After you’ve finished reading the entire chapter, look over the notes that you made to again familiarize yourself with the important information in the chapter. Check your memory by covering your notes and reciting the main points out loud. Then cover each main point in your notes and try to recite the subordinate points that you noted until you have reviewed each headed section. This review should take only about five minutes.

Advantages of the SQ3R Reading/Study System

The SQ3R Reading/Study System provides students with a great deal of repetition, breaks the task of reading into smaller segments, and has a built-in comprehension-monitoring system.

- **Great Deal of Repetition.** One of the greatest advantages of using the SQ3R system is that it allows for a great deal of repetition of the important

information in the chapter. As you learned in Chapter 4, repetition is one of the key ingredients in learning. By going through all of the steps in the SQ3R system, you're repeating the key information in the chapter at least three or four times. As you go through the five steps, you are surveying the chapter to gain information about the topics presented, formulating questions about the material, reading to find the answers, reciting important information aloud, and, finally, reviewing again what you've read.

- **Focus on Smaller Segments of Material.** Another advantage of SQ3R is its focus on smaller units of material. You work on reading and reviewing the material in each headed section before moving on to the next. By focusing on each "headed" section and going through all of the steps, you're breaking the task of reading an entire textbook chapter down into smaller units. If you have difficulty reading even ten pages of text at one time, you may find SQ3R to be very helpful. Most students who use the five steps in the SQ3R system do report a greater understanding of the text material than they had before.

- **Built-In Comprehension-Monitoring System.** Another advantage of SQ3R is that it has a built-in comprehension-monitoring system. When you stop to recite the answer to the question that you formulated, you're testing your understanding of the material that you read. This step in the SQ3R process keeps you on track as you read. Knowing that you must be accountable for what you have read can prevent the passive reading that so often characterizes text reading.

Adapting SQ3R

There are a number of ways that you can adapt or modify SQ3R to make it more effective for college-level texts. First of all, you don't have to use SQ3R for all your reading assignments. Many students use SQ3R or a variation of it only for reading their most difficult textbooks. Try using SQ3R with an easy text and with a difficult-to-understand text. You probably discovered that you really didn't need to use SQ3R with your easy textbook, but you also may have discovered that it did help improve your comprehension with your hard-to-understand text.

- **Formulate Broad Questions.** Because college texts contain so much information in each headed section, you need to modify the way you generate questions for each heading. If you simply ask "What is the . . ." type of questions, you may be ignoring a great deal of important information. For example, the question, "What is sensory adaptation?" would have led only to the review of the definition: "Sensory adaptation is a gradual decline in sensitivity to prolonged stimulation." Other important points would have been overlooked. You may find it more useful to generate broad questions such as "What do I need to know about sensory adaptation?" or "What's important about sensory adaptation?" Broad questions will lead you to read for all of the important information within the headed section.

- **Highlight the Answers to Your Questions.** Instead of simply reading to find the answer to your question, highlight each point. That way you will have a record of the important information when you're ready to study for exams. If you don't like to highlight, you could write your question in the margin across from the heading and then write the answers in the margin below (do this in the text or on notebook paper if your text has narrow margins).

- **Recite Using the Headings as Cues.** When you finish reading each section, stop and cover the material you highlighted or noted and recite the material using the headings as cues. Look back at the selection entitled "Sensory Adaptation." Which information would you recite from the selection?

- **Review at the End of the Chapter.** Go back at the end of the chapter and write questions about the details in the headed sections, recite the answers to your questions, answer end-of-chapter questions, or take online tests. Instead of simply repeating the same answers that you gave before, try to make connections within the material or focus on specific points that you'll need to know for an exam. By modifying the way you use SQ3R, you can still make it an effective and an efficient study tool, especially for reading very difficult textbooks.

The S-RUN-R Reading/Study System

The SQ3R system has been adapted by many reading and study skills educators. Because of its simplicity, one variation that may be very useful for college students is the *S-RUN* (Survey, Read, Underline, Notetaking) reading method designed by Nancy Bailey.³ Bailey's students were reluctant to use SQ3R because it seemed like too much work; however, they used S-RUN with great success.

The Five Steps in S-RUN-R

Survey. The first step in the S-RUN-R reading/study system is to survey the entire chapter. Read the title, introduction, headings, subheadings, and summary (and glance at pictures, charts, and graphs). Like P2R and SQ3R, this survey provides a quick overview of the chapter, building background and interest. You should spend only about two (for short chapters) to five minutes (for longer chapters) completing the survey. If it's taking you longer, you're probably reading too much or stopping too long to look at the illustrations.

Read. Instead of formulating a question before reading a headed section, write the heading on a piece of notebook paper next to the left margin. Just copying the heading helps you pay more attention to it and may help focus your reading. Then read the section as you would any other text material, thinking critically about the material.

Underline. After you finish reading each paragraph, think about what was important in the paragraph and underline or highlight the important information. As you'll see in Chapter 8, highlighting is more effective than underlining, so feel free to make the change. In the next chapter, you'll learn more about how to choose what to mark. For now, highlight the information that you think you would like to review for an exam.

Notetaking. As soon as you complete all of the highlighting for the entire headed section, stop and turn back to your notebook page. Now take notes on the key information. Briefly summarize the underlined or highlighted information under the previously written heading. Skip to the next line in your notebook, indenting slightly, and write the notes using meaningful phrases as you do when taking lecture notes. Don't just copy what you highlighted; try to put the information into your own words. Taking text notes helps you get a better understanding of the information and helps you condense it even more. By putting the information in your own words, you'll increase your comprehension even more. Continue jotting down each heading, reading, underlining (or highlighting), and taking notes for each remaining headed section.

Review. When you've completed the entire chapter, review to reinforce the important information. You can recite the key information that you wrote under each heading. Doing the end-of-chapter questions (if there are any) may also help you review the key information in the chapter. Some students find that predicting questions and creating self-tests helps them identify and practice the key information in the chapter. You may also create a recall column in your textbook or for your text notes. Writing questions in the margin can help you prompt your memory of the key points you underlined (or highlighted) or included in your text notes. You can use the review step to simply get more repetition on the material or to actually check your understanding or memory of it. Writing questions in the margin of your textbook or notebook provides you with repetition of the material, but

Advantages of the S-RUN-R Reading/Study System

S-RUN-R provides you with many of the same benefits as SQ3R. It allows you to read the material in smaller chunks, helps monitor comprehension, and provides you with a great deal of repetition. Unlike SQ3R, S-RUN-R helps you focus on all of the important information in the section rather than just one answer to one question. S-RUN-R also increases comprehension, condenses the material, and prepares the text for later review.

- **Identifies All of the Important Information.** S-RUN-R is designed to help you identify all of the important information in the headed section rather than one answer to one specific question.
- **Increases Repetition.** You actually get more repetition on the important information with S-RUN-R than any of the other reading/study system. You gain a little information during your survey, another repetition as you read the paragraph, another chance to read the material as you highlight it (your eyes do follow your marker, don't they?), another repetition when you go back and read your highlighting before taking notes, another repetition as you write the material in your notes, and at least one more as you review the material. If you then create questions and practice answering them, you'll have at least three more. That's up to nine repetitions on the material.
- **Increases Comprehension.** S-RUN-R also dramatically increases comprehension. Working on the material in small chunks gives you an opportunity to understand each concept well before moving on to the next section in the text. You'll also increase your comprehension because you're writing the notes in your own words. Finally, S-RUN-R makes you think about what you are reading. You can't highlight effectively, take notes, write questions, and actively review the material without thinking about what the text material means.
- **Prepares the Text for Later Review.** In the process of highlighting the text and taking notes, you're identifying the important information that you'll have to review for an exam and condensing the material for study. Without highlighting or note taking, you would have to reread the entire chapter again before your exam, which is not a very effective way to use your study time, as you'll learn in Chapter 10. With a good set of notes to review, you can spend your study time learning the material, rather than trying to repeat the process of identifying what you need to learn.

h. Don't Work Alone on Problem Set

- You can work on problem sets in small pieces while you're between classes or activities." Concentrating on only one or two problems a day will help you avoid mental fatigue. Once your brain gets tired, it's easy to stall—but if you spread out your work, you will end up spending fewer hours on the assignment than if you tried to do it all at once.
- Even with a smart schedule, however, you will probably still get stuck occasionally. When this happens, use all the available resources to help you get unstuck. If you're allowed to collaborate with your classmates, which is often the case in technical courses, definitely take advantage of this opportunity.
- **Step 1:** Identify one or two students who share a similar skill level as you and then construct a regular schedule for working together on the class assignments.
- **Step 2:** Set your meeting dates for two or three days before the deadlines; this gives you time to first try the problems on your own and identify the ones that give you the most trouble. Then, when you meet with your problem set group, your energy will be focused where it's needed most. However, don't meet the day before your deadline. It's important to have at least one day before handing in the assignment so you can review all of your answers and fix any small mistakes.
- **Step 3:** You should also take advantage of office hours. Most technical courses hold office hours once a week, usually run by a teaching assistant (TA). These meetings are meant to clarify complicated concepts from class *and* to be a source of help on

hard problems. Always go to office hours, if you have time, and arrive knowing which homework problems pose the biggest challenge to you. Don't be afraid to ask for help. You will learn a lot during these weekly sessions, since the Tas will be able to walk you through the more difficult concepts—which will ultimately save you a lot of time and frustration.

i. Solve Problems on the Go

- **Step 1:** First, set aside a little block of time to familiarize yourself with a couple of problems, and make sure you understand exactly what is being asked. You may need to review your notes to refamiliarize yourself with the relevant concepts.
- **Step 2:** Next, try to solve the problem in the most obvious way possible. This, of course, probably won't work, because most difficult problems are tricky by nature. By failing in this initial approach, however, you will have at least identified *what* makes this problem hard. Now you are ready to try to come up with a real solution.
- **Step 3:** The next step is counterintuitive. After you've primed the problem, put away your notes and move on to something else. Instead of trying to force a solution, think about the problem in between other activities. As you walk across campus, wait in line at the dining hall, or take a shower, bring up the problem in your head and start thinking through solutions. You might even want to go on a quiet hike or long car ride dedicated entirely to mulling over the question at hand.
- **Step 4:** More often than not, after enough mobile consideration, you will finally stumble across a solution. Only then should you schedule more time to go back to the problem set, write it down formally, and work out the kinks. It's unclear exactly *why* solving problems is easier when you're on the go, but, whatever the explanation, it has worked for many students. Even better, it saves a lot of time, since most of your thinking has been done in little interludes between other activities, not during big blocks of valuable free time.

j. Write Solutions right the first time

- Another important time-saving tip for problem set work is to record solutions formally the first time you write them down. Many students first jot down their answers informally and then return later to reformat them into something neat enough for submission. There is no reason to include both steps. You are, for no good reason, adding a lot of extra time to the process. Instead, go slowly and deliberately the first time. Write your answer carefully, and clean it up immediately until it is of submission quality. Then you can cross the assignment off your list and it will be one less.

Step 3- Marshal Your Resources

TIP

Tips for Reading College Textbooks

❑ **Read textbooks differently.** You can't read a college textbook the same way you read a novel or magazine article. You won't remember everything you read or even understand all of it after one quick reading. You may need to slow down or reread some portions of the chapter.

❑ **Read the chapter before the lecture.** As you learned in Chapter 5, reading the text chapter before the lecture will help you build background on the topic, learn the basic organizational structure of the material, and take better lecture notes.

❑ **Build on prior knowledge.** Relate what you're reading to what you already know. By connecting the information in your textbook chapter to your own experiences and previous knowledge, you can improve your comprehension and memory of the material.

❑ **Divide the chapter into readable chunks.** A forty-page chapter is probably best read in four chunks of ten pages each. A twenty-page chapter may be read in two chunks of ten or in three chunks of seven, seven, and six pages. Dividing the chapter into smaller reading segments increases your comprehension and actually decreases the time you spend reading the chapter.

❑ **Preview the chapter before you read.** Read the title, introduction, headings, glance at charts and pictures, and read the summary. A two- to five-minute preview reduces the total time you spend reading and increases your comprehension.

❑ **Use a reading/study system.** Use a reading/study system such as P2R, SQ3R, or S-RUN-R, or

develop your own system. Be sure you use one or more active strategies before you read the chapter, as you read the chapter, and after you read the chapter.

❑ **Mark the text or take notes as you read.** Highlight, underline, or take notes at the end of each section. Wait until you finish reading the paragraph or a "headed" section before you begin to mark your text.

❑ **Monitor your comprehension.** Stop to check your understanding of the material at regular intervals. Look for connections between topics and how the new information relates to your prior knowledge. Pause at the end of each paragraph or page and ask yourself if you understand what you're reading.

❑ **Review what you read.** After you complete your reading assignment, take five to ten minutes (or more) to review what you just read. Think about the main points that the author made in the chapter. Write recall questions or summarize the key information in the margin of the text.

❑ **Read or review as you commute.** Just thinking about what you read as you drive to class will help you improve your comprehension of the material. If you commute by bus or train, use that time to complete one or two chunks of your text chapter.

❑ **Prompt your memory.** Use the headings of your textbook or your notes or use questions in the margin to prompt your memory. Recite the information out loud or write it down.

Read the Chapter Before the Lecture

Reading the textbook chapter before going to class is a good idea. It gives you some background for the lecture. You will be able to understand more of the lecture and recognize many of the main ideas as they are presented. As a result, you should be able to take better lecture notes during class. If you find that listening to the lecture helps you understand the textbook better, *skim* the chapter before the lecture and then read it more carefully afterward. **Skimming** involves reading the introduction, the headings, the first sentence of each paragraph, and the conclusion in order to get some idea of what the main ideas are and how they are organized.

Read Ten Pages at a Time

Which would you rather read, a fifty-page chapter or a ten-page chapter? Most students say they'd much rather read a ten-page chapter. Did you? Take a look at the chapters in some of your textbooks. You may be surprised by how long they are. Fifty-page chapters are standard for many texts. Reading fifty pages at one time may not seem like a difficult task, but it is. One page of a college textbook may contain as many words as three pages of a novel. Have you ever sat and read 150 pages of a novel at one time? Not only are there more words on the page, but also the text may be difficult to read and understand. If you find that your attention begins to wander or you just aren't grasping the information anymore, you should stop reading and continue later.

Some students find that it takes them much longer to read the second half of the chapter than the first because, as they get tired or lose interest, their reading speed starts to slow. Time yourself as you read one of your chapters. Note the time at the end of each ten-page section. Did you read the earlier sections more quickly?

Using good time-management strategies can help you improve your textbook reading. Reading a chapter in chunks of ten pages or even five pages at one time may help you maintain a faster reading speed and still have excellent comprehension. You also may find that when you're working on only ten pages of text at one time, you feel more motivated to highlight or take notes as you read.

Monitor Your Comprehension

As you read your textbook, you should be aware not only of what you're reading but also of whether you understand what you're reading. You should pause frequently to reflect on what's being said. Too many students read their textbooks in a mechanical way. Their eyes see the words, but their minds are a million miles away. Comprehension monitoring will help you keep your mind on what you're reading. **Comprehension monitoring** refers to your own evaluation of whether or not you comprehend (understand) what you read. You can monitor your comprehension of the text material by stopping every so often (at the end of a paragraph, section, or page) and asking yourself what you just read and whether you understood it. When you realize that you don't understand what you've just read—when comprehension breaks down—you may find that you can correct the problem. The easiest thing to do is to read the sentence or the paragraph again (perhaps out loud if you're an auditory learner). Sometimes reading ahead or rereading the previous paragraph can provide more clarification. Looking up the definitions of unfamiliar vocabulary words can also help you gain a better understanding of the material. When you aren't able to correct a comprehension problem on your own, you should mark it and then continue reading. The reading/study systems discussed later in the chapter will also help you monitor your comprehension and get more out of your reading.

ACTIVITY 7-2

Monitor Your Comprehension

As you read your next text assignment, put a check mark in the margin every time you stop to think about what you have read and whether you understood it. After you complete the reading assignment, look at the placement of your check marks. Do they occur within paragraphs, mainly at the end of paragraphs, at the end of the page, or even less frequently? What types of comprehension problems did you experience? What strategies did you use to correct your comprehension problems? Did you notice any improvement in your comprehension of the material?

BECOME A CRITICAL READER

What was the single most important thing that you learned in Chapter 6? To answer that question you need to determine the author's purpose for writing the chapter, identify the main and supporting points in the chapter, consider your purpose for reading the chapter, and evaluate the information that was presented. To choose the single most important point the author is making, you need to understand and think critically about each of the points in the chapter. After all, you must judge the value of each statement based on its own merits, your prior knowledge, and your purpose for reading.

What Is Critical Reading?

Actually, it's difficult to define critical reading (perhaps because it's difficult to accurately describe what really happens when we read). However, most reading researchers agree that critical reading involves thinking critically as we read and after we read. This doesn't mean that you're expected to look for what's wrong with everything you read—you're not being critical in terms of finding fault. Instead, **critical reading** involves questioning, analyzing, and evaluating what you read. You use critical reading skills all the time. If you read labels of competing products when you go to the grocery store, you're using critical reading skills. If you read the course description guide before choosing your class schedule, you're using critical reading skills. When you skim several journal articles before choosing the one or two to use for a term paper or speech, you are using critical reading skills. In each case, you're thinking critically about the information as you read it and after you read it.

Understanding Critical Reading Skills

To think critically about what you read, you must be able to comprehend, analyze, synthesize, apply, and evaluate the material (see Figure 7.2). It's a process that requires you to be actively involved as you read each of your text assignments. You need to question as you read, monitor your comprehension, make connections and comparisons to other material or your own prior knowledge, and finally evaluate what you've read. To do all of these things, you must become an active participant in the reading process.

Comprehension

Because many college texts are so difficult, students don't always understand what they read. You need to **comprehend**—understand—what the individual words

ills

Comprehension:	Understanding what you read
Application:	Connecting what you've read to your own prior knowledge so that you can use it in a new or different way
Analysis:	Breaking the information into its component parts—identifying main points and their supporting details
Synthesis:	Pulling information together from individual statements made in the paragraphs or headed sections into more general ideas or concepts
Evaluation:	Judging the value of the information—determining whether it is accurate and presented in an objective way

mean and how each group of words works together to create meaning within a sentence, paragraph, and headed section. The use of new, specialized, technical terminology is one of the most common causes of comprehension problems. You may be dealing with words you've never even seen before—you may not recognize some of the words, know how to pronounce them, or know what some words mean. Some words take on new or specialized meanings because of the way they're used in particular subject areas. Without understanding the words in the text, you can't understand the ideas and concepts that are presented. For this reason, it's important to look up words that you don't understand and gain some familiarity with the new terminology within the text. Without a clear understanding of the text material, you can't make judgments about its quality.

Application

You can gain a better understanding of your text material if you **apply** what you're reading to your own prior knowledge of the material or to your own life experiences. Many reading researchers agree that you can't think critically about written material if you don't have some prior knowledge or experiences with which to compare it. Many college texts are difficult because they contain abstract theories and concepts. Other texts include topics that you may never have even heard of before.

Analysis

To be a critical reader, you also must learn to analyze the information presented in the text. Learning to break the information into its component parts—**analysis**—will help you look more critically at the points made within your reading assignment. You need to identify the main points and their supporting details to better understand the relationships among and within the material. To understand the main points within the headed section, you have to consider how each of the reasons, facts, details, or examples supports the topic or main point being discussed. By identifying each component within the paragraph, you also can better evaluate the quality of the arguments the author is making. If you're currently marking your text, you're thinking about what's important as you read. In Chapter 8, you'll learn more about how to identify the main points and supporting points in your text material.

Synthesis

Your ability to organize and **synthesize**—pull information together from individual statements made in the paragraph (or headed section) into more general ideas or concepts—is critical to understanding what you read. You need to think about how each supporting point adds to the meaning of the main points in each paragraph and how the main points in each paragraph connect to form the key ideas presented in the text. By combining the smaller components within the text, you can gain a better understanding of the information or reach conclusions that aren't directly stated. This may involve adding to the prior knowledge you already have about the topic, modifying what you previously thought about the topic, or learning new information about the topic. Chapter 9 contains a number of strategies that help you learn to pull information together, using your own organizational system.

Evaluation

Critical reading also involves **evaluation**—judging the value of the information in the text. You need to think critically about what you read because not all material that you will read is accurate or presented in an objective way. Most textbooks are for the most part reliable sources of information, written and published by reputable authors and publishers. However, you'll also be expected to read many other

types of material in many of your classes. You may read journal articles, research studies, critiques, essays, letters, and other original documents. As you begin to use the Internet to locate information, you need to be even more cautious in your acceptance of everything you read as factual and accurate. Anyone can put anything on the Internet. There are few, if any, regulatory agencies to monitor the accuracy or integrity of the information.

Considering the source of the information and the credibility of the author is only one part of critical reading, however. You must also judge the quality of the main and supporting points made in your reading material. Ask yourself if the facts, reasons, details, and examples really do support the author's conclusions. Think about whether there's enough evidence given to prove the point. Consider whether the evidence is **factual** (statements that can be verified as true or false) or only the **opinion** (statements that express feelings, attitudes, or beliefs) of the author. Watch for **biased language** (words used to sway you to believe one side of the argument) or bias in presenting only the evidence that supports one side of the issue.

To be a critical reader, you must also think about how the new information fits with what you learned in the lecture, another reading assignment, or your own prior knowledge. You should also consider how well the information that you read accomplishes the author's purpose for writing and your purpose for reading.

1. Use Rules of Reading Method To Read and Analyse Data. Use Rules of Reading Volume 4-29.

Strategies for Improving Critical Reading Skills

You can use many different strategies to improve your critical reading skills. In the section that follows, you'll find some of the more common ones that may help you read your textbooks more effectively. As you read each list of strategies, put a check mark next to the ones that you tend to use on a regular basis. Then select several others to try out as you complete your reading assignments for the remainder of the term or semester.

Comprehension Strategies

- Preview the chapter before reading it to build background.
- Create a set of word cards before you read (see Chapter 10) to become familiar with the new technical terminology.
- Look up unfamiliar words in the dictionary or in an online dictionary and write a synonym above the word.
- Read to the end of the paragraph to gain a better understanding of the material before highlighting.
- Go back and reread a sentence or two if you don't understand the material.
- Highlight or take notes on the material.
- Utilize any study aids that have been built into the text. For example, if the author has included definitions in the margin, refer to them as you read the term in the text. Also, complete any exercises or reviews built into the material to reinforce the key information.
- Refer to photos, charts, graphs, examples, and any other figures as they are mentioned in the text to increase your understanding of the material.
- Stop at the end of each paragraph or headed section and think about what you just read. Try to recite or mumble the main points that were made.

Application Strategies

- Think about how the material you are reading is related to what you already know.

- Look carefully at any examples that are given and think about how they demonstrate the points being made.
- Make up your own examples for the material, if possible.
- Apply the information that you read to questions, activities, or exercises that are included in the chapter.

Analysis Strategies

- Pay attention to the headings and subheadings in the text because they contain the topics that will be discussed.
- As you read, identify the main points that the author is making and highlight them or write them in the margin (or on separate notebook paper).
- Develop specific questions in the margin to focus on the key points that you will need to remember for the exam.
- After you identify each main point, look for any supporting details that have been used by the author. Look for facts, reasons, details, or examples that the author has used to “prove” the point he or she has made. Highlight or note them under each main point.
- Look for the conclusion (concluding sentence at the end of a paragraph or concluding paragraph) and compare the points the author makes to the earlier points made.

Synthesis Strategies

- Go back to the individual points that you highlighted and take notes. Organize the information so that the related details are under the correct heading or sub-heading in your notes.
- Write general questions in the margin that will help you pull together the details that support the main points that were made.
- Summarize the information that was presented. Either talk about the information, putting it in your own words as much as possible, or write a summary of the information.
- Compare the information that you read in one section of the text with information that you read in another. Look for both similarities and differences and pull together the information as you make notes on your reading.
- Create concept maps or charts (see Chapter 9) to show how the information is connected.
- Create study sheets (see Chapter 10) to integrate the information from the text and the lecture on each individual topic.

Evaluation Strategies

- Ask yourself what the author's purpose was in writing the material. Was it to present you with a factual description of the topic; to persuade you to agree with one point of view; or to convince you to buy a product, vote for one candidate, or take a particular action?
 - Consider the author's credibility. Does the author have expertise on the subject? Does the author have experience with the subject? If the author is not a credible source, can the information be reliable?
 - Ask yourself if the facts, reasons, details, and examples really do support the author's conclusions.
-
- Think about whether there is enough evidence given to prove the point being made. Does the author provide different viewpoints on the topic?
 - Consider whether the evidence is factual or only the opinion of the author.
 - Watch for biased language or bias in presenting only the evidence that supports one side of the issue.
 - You may find that it's helpful to annotate your text as you read. Janet Maker recommends noting the author's point of view (position or stance on the topic) in the margin of the text and then listing each of the arguments or supporting points under it (across from its location in the text).¹ Jotting the supporting points in the margin helps you identify and evaluate the quality of the evidence.

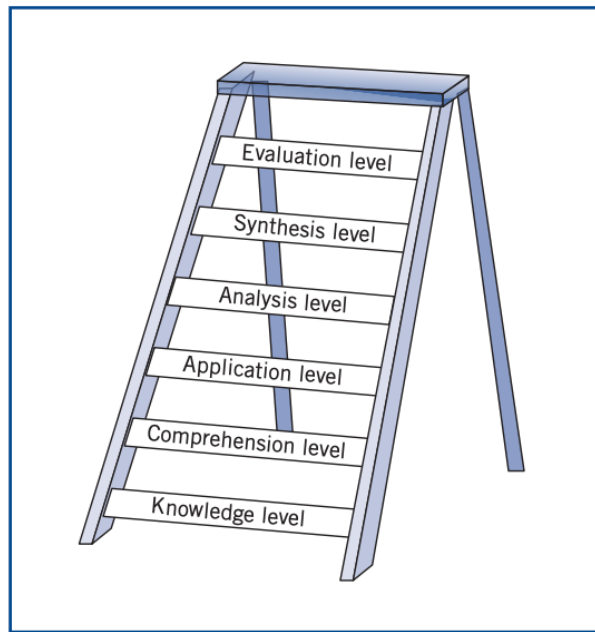
2. Define The Challenge:

- Before you can conduct any meaningful studying, you must first define the scope of the exam. As Simon from Brown puts it: “You need to know what kind of information the professor wants you to know.” To accomplish this goal, answer the following questions:
 - I. Which lectures and reading assignments (or problem sets) are fair game?
 - II. What type of questions will there be, and how many of each? As Christine from Harvard explains: “It’s helpful to know in advance what *kind* of knowledge will be asked for on the exam—IDs, dates, broad syntheses of the texts’ major arguments?”
 - III. Is the exam open note or open book?
 - IV. For a technical class, will formulas be provided or do they need to be memorized?
 - V. How much time will be available? Does the professor expect the exam to be easy to complete during the test period or a challenge?

Learn About the Exam

The first thing to do in preparing for an exam is find out what the exam will be like. If your professor hasn’t already discussed the exam, ask about it. You need to know what types of questions you will be expected to answer. Ask whether the exam is objective or essay or both. If the exam is an objective one, find out if all questions will be multiple choice or if some will be true/false, matching, or completion. The more you know, the better you can prepare.

You also need to know how many questions will be on the exam. If you have 100 questions on four chapters of Life Science, you can expect about 25 questions on each chapter. On the other hand, if you have only 20 questions on the same four chapters, you’ll have only 5 questions per chapter. The more questions you have from each chapter, the greater the probability that they’ll cover not only main ideas



but also less important points from the chapters and your notes. If there are only a few questions from each chapter, they are more likely to cover the main ideas or concepts. However, you can't depend on this. Some professors who ask only three or four questions per chapter still test on "picky little things." And, don't forget: Even one essay question can cover a great deal of material.

Levels of Questions

Many college students don't realize that professors test their understanding of the material at many different levels. Although most of the questions on your high school tests depended only on your ability to memorize, six different levels of questions are often found on college exams (see Figure 10.1). Read the description of each in the paragraphs that follow. Then look closely at the sample questions after each paragraph. They are based on the text selection "The Growth of Thought: Cognitive Development," which you read in the last chapter (Figure 9.4).

1. Knowledge-level questions require only rote memory; they're the easiest type of question to answer. They include remembering terms, facts, dates, lists, and so on. To answer this type of question, you need only to recognize the information as it was written in the text or spoken in the lecture. Without even reviewing the material, you can probably recognize the answer to the following sample question.¹

According to Jean Piaget, the four levels of cognitive development are the sensorimotor period, the preoperational period, concrete operations, and

- a. advanced operations.
- b. the abstract period.
- c. formal operations.
- d. the adult period.²

2. Comprehension-level questions require you to understand the material well enough to be able to identify concepts and issues even when they're phrased differently from the way you read them or heard them presented. To answer a comprehension-level question, you need to check its meaning carefully against what you learned. How does the following question rephrase the issue of age and cognitive development?

At which of Piaget's periods of cognitive development would we expect most kindergarten students to be operating?

- a. Concrete operations
 - b. Formal operations
 - c. Preoperational
 - d. Sensorimotor
3. Application-level questions require you to apply the information that you learned to a new situation. Application questions are common in math and science courses, but as you can see below, they may appear on any exam. What information do you have to know in order to answer the following application-level question?

Four-year-old Bobby insists that his mother give him a big glass of orange juice as she does for his older brother. But Bobby will drink only about three to four ounces of orange juice. Fortunately, Bobby's mother remembers Piaget's theory from her college Child Development course. How does she satisfy Bobby's wishes without wasting most of the orange juice?

- a. Promises to refill Bobby's glass if he finishes his juice.
- b. Gives him his juice in a tall, thin glass.
- c. Allows him to pour as much juice as he wants.
- d. Hides the orange juice from him during breakfast.

4. Analysis-level questions require you to break down a complex concept into its components or parts. Many essay questions involve analysis. Look at the sample essay question below. Think about how you might go about answering it. What information do you need to answer this question?

Five-year-old Sally and her seven-year-old sister, Jill, each have a ball of clay exactly the same size to play with. Jill flattens her clay into a pancake, and Sally insists that Jill now has more clay than she does. Explain, using the concepts of centration and irreversibility, how Sally came to that conclusion.

5. Synthesis-level questions require you to bring information together into a single unit or whole. Many essay questions involve synthesis. What information from the selection do you need to know in order to answer this question? How would you combine the information to answer the question?

You are designing a curriculum for first-, second-, and third-grade science classes. Assuming that one of your goals is to increase the students' abilities to solve conservation problems, describe some science demonstrations that could help achieve that goal.

6. Evaluation-level questions require you to make judgments about the value or worth of an idea. In most cases, both analysis and synthesis are required to answer an evaluation-level question. They are the most difficult type of question to answer and require the highest-level thinking skills. What information would you need to know to answer the following question?

FIGURE 10.6
Effective Study Tools and Strategies for the Five-Day Study Plan

STUDY TOOL	PREPARATION STRATEGY	REVIEW STRATEGY*
Highlighting	Re-mark text and *unknowns	Recite main points out loud
Text notes	Dig through text and write main points and supporting details; develop recall column	Recite information, identifying connections among ideas from headings and/or recall columns
Predicted questions in the margin	Predict questions and underline the answers	Recite the answers out loud
Concept maps	Design and draw maps	Sketch from memory or recite key points
Charts	Create charts	Recreate charts from memory on scrap paper
Geographic maps	Prepare copy of map without answers for self-test	Recite and/or write out answers; check original
Study sheets	Dig through text and lecture notes to select, condense, and organize material under main topics	Practice reciting out loud or in writing
End-of-chapter questions	Write out answers	Practice reciting answers
Word cards, question cards, formula cards, problem cards	Select information and write out cards	Recite out loud or in writing; shuffle cards and retest; test in reverse; retest missed items
Study groups	Prepare materials as agreed to by group	Explain your material to group and take notes on others' explanations; discuss
Self-tests	Select information and construct test	Take test in writing and/or recite out loud—retest
Predict essay questions	Predict specific essay questions; plan and prepare answers	Practice reciting main points and writing out answers
List of 20, 30, or 40+	Determine content and write out list	Recite out loud and write out troubling items

3. Construct Mega Problem set (Organizing Technical Course Material)

- **Step 1**-Start a pile for each problem set that covers material that might appear on the exam.
- **Step 2**-Next, you'll need to supplement each problem set with sample problems from your lecture notes. For each lecture relevant to the upcoming exam, do the following. In other words, this process transforms your problem sets into *mega-problem sets* by adding extra problems drawn from your lecture notes.:
 - I. Match the lecture to the problem set that covers the same material.
 - II. Copy sample problems from these lecture notes onto a blank sheet of paper. You don't have to copy the steps or the answers, just the questions.
 - III. Label the blank sheet of paper with the date of the lecture. This will help you later figure out where these problems came from (and more important, where their answers can be found).
 - IV. Fasten this sheet with a paper clip to the problem set you matched it to in step one.
- **Step 3**-Finally, you must augment your mega-problem sets with *technical explanation questions*. What are these? For every major topic covered in a particular mega-problem set, jot down a question that asks you to explain the basics of the topic. For example, as Greta from Dartmouth recounts, in an "economics course, I would make study sheets and then add a general question such as: *what happens when a government increases spending and lowers interest rates?*"
- **Step 4**- It's important that you add these technical explanation questions in addition to your regular sample problems, since they will reveal whether or not you understand the underlying concepts or if you've just memorized the steps for some particular problems.
- **Step 5**- One last note: If your professor makes a practice exam available, then print out a copy of it and store it with your mega-problem sets. For technical courses, sample exams are a great review

tool, and you will definitely want to have them handy when it comes time to study.

4. Prepare Memorization Aids

- **To memorize: Formulas, Equations, Artwork, dates, chronologies.**

You may use the following aid:

- I. **Flash Cards-** Buy a stack of index cards, put the prompt on one side and the answer on the other. Constructing these flash cards, however, can take longer than you might imagine, so start early. If possible, start writing up your cards at least a week before the first day you plan to actually study. The activity is mindless—you can write flash cards while watching TV—so it shouldn't be too hard to get them done, in advance, bit by bit.

5. Schedule Your Organization Wisely

- When you review, you want your brain at full power. If you organize your materials the same day that you review them, your brain will be too tired to accomplish both effectively.

Step 4- Conquer The Material

- **Trust The Quiz and Recall method (Active recall, and not passive reading).**
 - I. The most effective way to imprint a concept is to first review it and then try to explain it, unaided, in your own words. If you can close your eyes and articulate an argument from scratch, or stare at a blank sheet of paper and reproduce a solution without a mistake, then you have fully imprinted that concept.
 - II. **Don't Do:** The same is *not* true if you merely read over something. Passively reviewing a concept is not the same as actively producing it. Most students make the mistake of relying only on passive review; they read and reread their notes and assignments, and assume that the more they read, the more they will remember.

- **Create Concept Maps**

Create Concept Maps

Maps are visual displays of text information. They are a way of organizing the key information in the text into easy-to-read and easy-to-remember pictures or diagrams. Although there are many different types of concept maps, only *line maps*, *hierarchical maps* and *Semantic Webs* will be described in this chapter. You may find that mapping is a great way to take notes. When you take exams, this strategy may help you recall the information that you learned because of the way you organized it. You may also find that you can visualize it in your mind or remember how you set it up. Mapping is an even more active method than some of the ones we've discussed because you have to move outside the author's organizational framework and create your own.

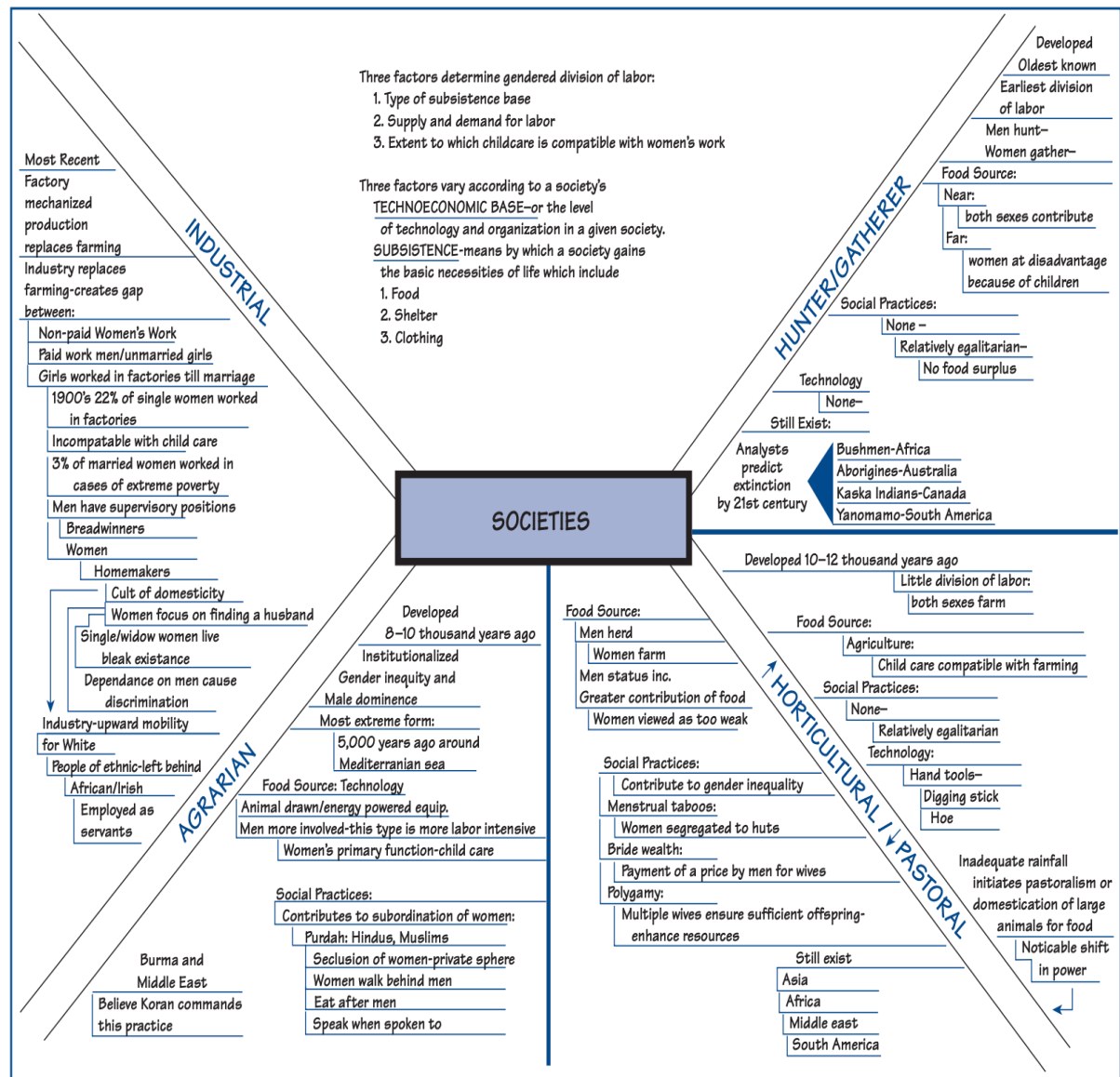
Line or Wheel Maps

One of the easiest types of maps to create is the line or wheel map. A **line** or **wheel map** is a visual display of information drawn by adding lines or spokes that radiate out from a central hub. You already may be familiar with time lines from history class. To create a line map for other types of text material, write the topic in the center of the paper and then add subordinate points on lines that radiate up, down, or out from it. Add supporting details by inserting lines that extend out from the previous lines. Many students like using line maps because they provide more space to write meaningful phrases.

upside down when you're ready to study. There's also a tendency to simply list all of the details on individual lines that extend directly from the heading. For texts that contain only a few details this is fine. However, some text material is so detailed that you could have fifteen or twenty lines all connected to one heading.

Instead, you need to create subheadings as you map the text information. The subheadings organize the information, separate the details into easier-to-remember chunks, and serve as additional cues to help you learn and retrieve the information. Although the author didn't include the subheadings *food source*, *social practices*, and *technology*, Christy created her own subheadings to better organize the text material in Figure 9.10. You may have also noticed that Christy made some notes on the introductory material from the text at the top of her map. As you create your own line maps to take notes on text material, feel free to move outside of the author's organizational structure and create one that will make your map a well-organized study tool.

FIGURE 9.10
Christy's Line Map



Hierarchical Maps

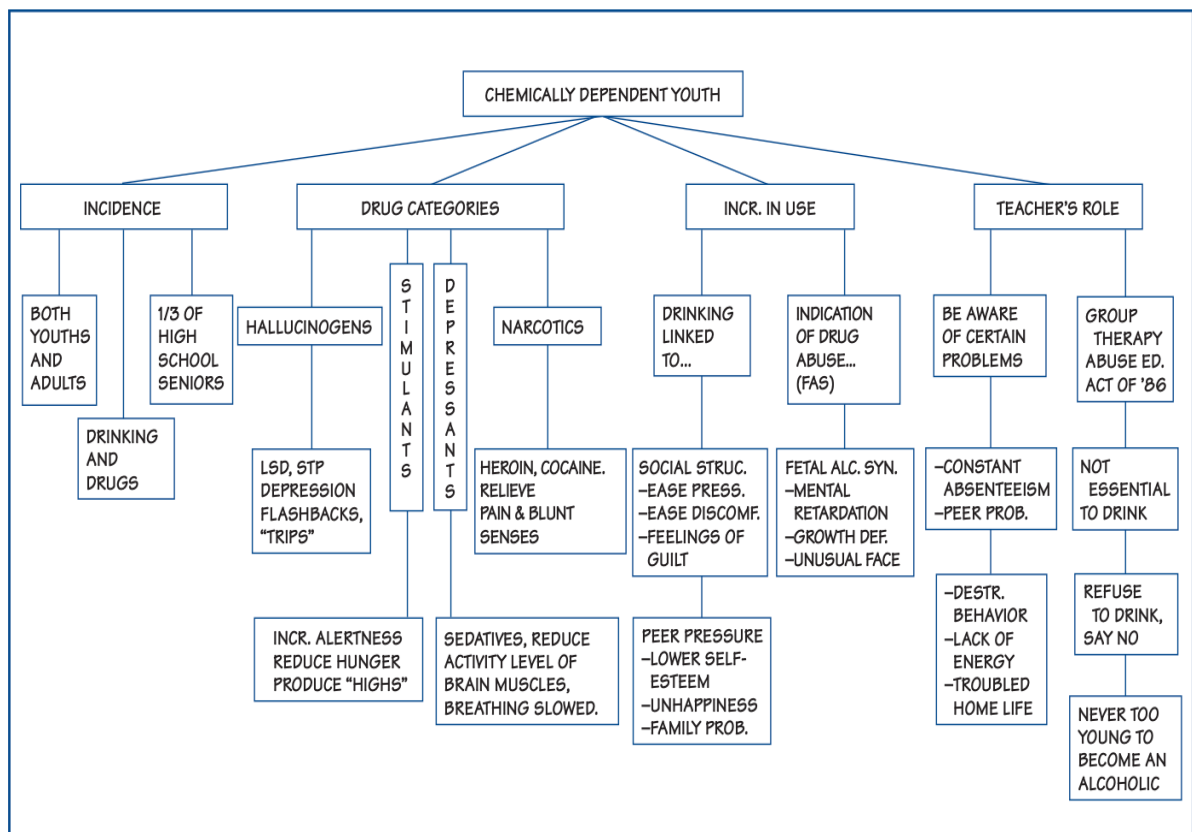
One of the most common forms of maps is the hierarchical map. **Hierarchical maps** provide a top-down display of information. You often see this form of map

in science texts in the form of flowcharts or process charts. To create a hierarchical map, write the topic at the top of the page and put a box around it. Then draw lines to indicate the subdivisions (the next level of headings) and write and box each of them. You can then further divide each of these points into one or more subheadings and then add supporting points. Look at Figure 9.11, the hierarchical map that Wendy developed from the text material from a special education textbook. Look for the excerpt entitled “Chemically Dependent Youth” on the *College Study Skills* Web site. You can see the natural progression from the main topic of the selection down to the supporting details.

Mapping is a very individual method of note taking. Feel free to make your map fit the material; don't try to make the material fit the map. In their map (Figure 9.12), Rayna, Barbara, and Amy put the greatest emphasis on the four types of drugs rather than focusing equally on all sections of the material. What else do you notice that is different about their map? If you said that they didn't use boxes, you're correct. What other differences do you notice?

FIGURE 9.11

Wendy's Hierarchical Map



Semantic Webs

One of the newest styles of mapping is the Semantic Web. Instead of using a top-down display, as in the hierarchical map, **Semantic Webs** radiate from a central focal point. There are four main components in a Semantic Web: the Core Concept (or Question), the Web Strands, the Strand Supports, and the Strand Ties. The **Core Concept** (or **Question**), is the main focus of the text material you plan to map. It may be the title of an article or a major division of the chapter or heading of a long section of text that you decide to map. To start your Web, write this word, phrase, or question in the center of a piece of paper and draw a circle or oval around it. The second component, the **Web Strands**, show the headings (or

subheadings if a heading is used as the Core Concept) that subdivide the Core Concept. They are joined to the Core Concept by lines that radiate from it. Circle each Web Strand as well. The **Strand Supports** do just what their title implies. They support the Web Strands. They include the details that support the Web Strands. Finally, the **Strand Ties** are words or phrases that are written on the lines that connect some of the information. They define the relationships between some of the Web Strands or Strand Supports.¹

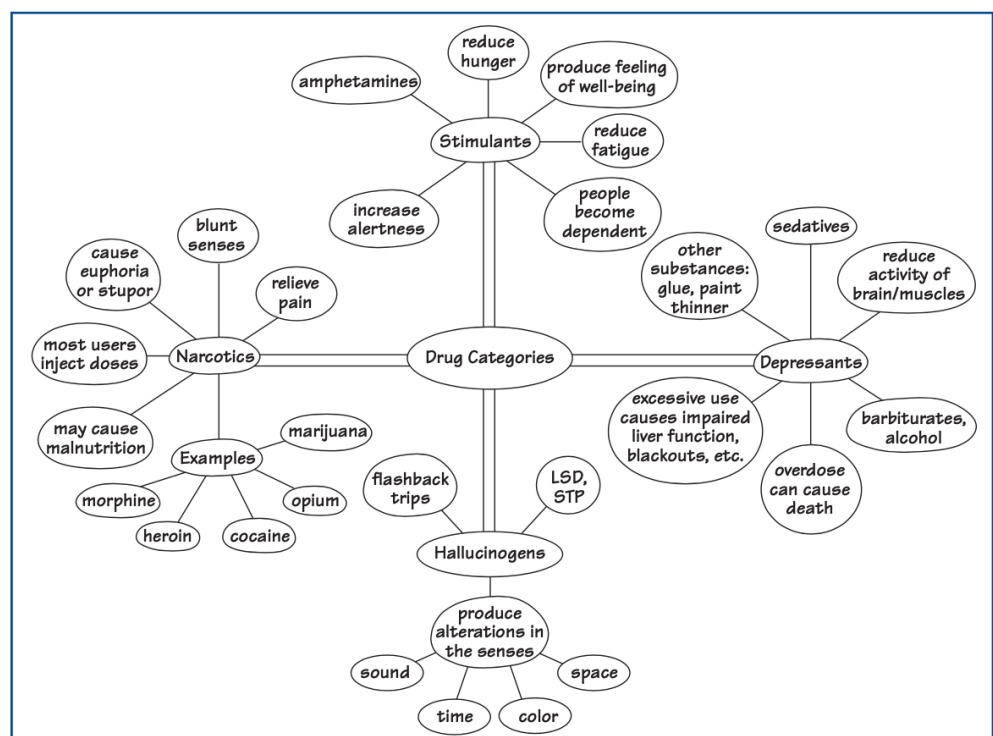
Look at Figure 9.13, the Semantic Web that Kelly produced for the “Chemically Dependent Youth” selection. Can you locate each of the components just described? First, what is the Core Concept? If you look at the center of Kelly’s Web, you’ll see that she used the phrase “Drug Categories.” It also is easy to find the four Web Strands because Kelly used double lines to connect them to the center focal point. You may have noticed that Kelly used several levels of Strand Supports. She moved from “Narcotics” (a Web Strand) to “Examples” (a Strand Support serving as a subheading) to “marijuana” (a detail). Even though this last level of support wasn’t in the “rules” for how to construct a Semantic Web, Kelly felt that the text information demanded further division. Don’t leave out information you think is important just because it doesn’t fit the formula for a particular type of map. Instead, adapt the mapping technique to fit your text material. You can have second-level, third-level, and fourth-level strand supports if the text demands it. Because college text material is so detailed, you should have more layers of Strand Supports. Remember, you’re going to use these maps to study for your exams. You may have

noticed that Kelly didn't add Strand Ties to her map. She could have written "used to" on the line between "Narcotics" and "relieve pain," or "leads to" on the line that connects "Narcotics" to "blunt senses."

After you complete your Web, review the information that you noted. If you aren't sure how some of your information related to the information connected to it, you may need to add Strand Ties to your map.

Color coding your maps can also help you recall the information. Color coding will work on any type of map, but it's especially effective for Semantic Webs because you create "clusters" of information for each of the sections of the text material. You can either draw the ovals in color or use a highlighter or colored pencil to fill in each portion of the map. For example, you could color code all of the information related to narcotics orange, stimulants red, depressants blue, and hallucinogens green. Using a different color for each of the clusters in your map helps separate the details and provides you with an additional cue to trigger your memory of the material. It's important to use light colors if you're going to shade the information that you write—you still want to be able to read it clearly. For some material, you may find that the colors you choose are related to the material itself, providing even more associations with the material.

FIGURE 9.13
Kelly's Semantic Map



- **Using the Quiz-and-Recall Method for Technical Courses.**
 - I. **Step 1:** Start with the technical explanation questions—thinking about the general concepts first will make it easier to solve the specific sample problems that follow.
 - II. **Step 2:** In nontechnical courses, try to provide an articulate answer for each problem, and if possible, give your explanation out loud, as if lecturing to a class. Otherwise, write out your answers clearly. Don't skip any important details.
 - III. **Step 3:** Once you're done with the technical explanation questions, move on to the sample problems. Try to answer each. Again, ***don't do this in your head***. "I don't just read the material," explains Worasom, a straight-A student from Brown. "I write the important equations and concepts out by hand." Your solutions don't need to be as detailed as if this was a real assignment, but they should clearly demonstrate that you know what you're doing. If you can't explain exactly how you got from the question to the answer, then you don't yet understand this problem. Be honest with yourself: If you're just regurgitating memorized solutions, you aren't prepared to handle new questions on a test.
 - IV. **Step 4:** As before, check mark the questions that give you trouble. Review the solutions for these questions. Take a break. Then repeat the process, except this time try to answer only the questions you marked on the previous pass. Follow this method until you finish a round with no checked problems.
 - V. **Step 5:** If professors make exams from past years available, these are a terrific resource." In this case, wait until after you finish your quiz-and-recall, and then try to complete the exam under timed test-taking conditions.
 - VI. **Step 6:** If you have trouble with a few questions on this practice exam, review them carefully.
 - VII. **Step 7:** If you have trouble with a lot of questions on this practice exam, then something went wrong with your previous review, and you need to go back through the material. Work through another round of question answering, and this time really make sure you understand each of the

steps. If you still have trouble, then it's time to seek out help from a classmate or a TA.

- **Memorize over Time**

- I. If you have material that must be truly memorized—dates, artists, chronologies, formulas—there are, unfortunately, no real shortcuts. You just have to keep working with your flash cards until you have no trouble providing the right answer, even after you shuffle the cards into a random order.
- II. **Do and Don't Do:** Memorization is particularly dependent on your available mental energy. It doesn't work if you try to commit items to memory for eight hours straight, but it does work if you memorize only an hour at a time and only one or two hours a day. So separate the task of memorizing from your other review. Spread the work out over many days, and never dedicate too much time to any one sitting with your flash cards.

- III. **Memory Strategies:**

- a. **Spaced Practice**

Spaced practice, on the other hand, involves spacing your study time over a longer period, with breaks between practice sessions. Studying for short periods of time, such as one- or two-hour time blocks, prevents boredom, helps avoid fatigue, and improves concentration and motivation. If you space out your study over a period of days (see the Five-Day Study Plan in Chapter 10 for more information on how to space your study), you gain additional benefits. First of all, you delay forgetting. As pointed out earlier, even when you think you've learned the information, some information usually is forgotten. By self-testing as you review the same material each day, you have a chance to find out what you've forgotten and work on it again. In addition, you benefit by reviewing and reinforcing the information that you previously studied. Spaced practice, or distributed practice (as it is also known) allows time for the information to consolidate or jell in long-term memory. During **consolidation**, information is organized and stored in LTM. If you try to shove too much information into memory at one time, you won't be able to retrieve very much of it. One explanation for this is that the longer you study, the more

inhibitions you develop (feeling tired, bored, and so on) that decrease your efficiency for storing them material in LTM. With massed practice, you may get to the point where you're just reading over the material rather than "working on it" to learn it.

b. Break Down Tasks

Instead of trying to learn all of the material for your exam at one time (cramming), study only one or two chapters (and the accompanying lecture material) each day. When you study small chunks of material at one time, you can do a better job of getting it into LTM. It's easier to stay focused and actively involved in your learning when you don't feel as if you have to learn all of the information at one time. You'll be more willing to take the time to use active learning strategies such as creating study sheets, predicting questions, making word cards, reciting the information in your notes, or testing yourself on the material. By breaking down study tasks and organizing and storing small units of material, you increase the likelihood that you'll efficiently and effectively store the material in your LTM.

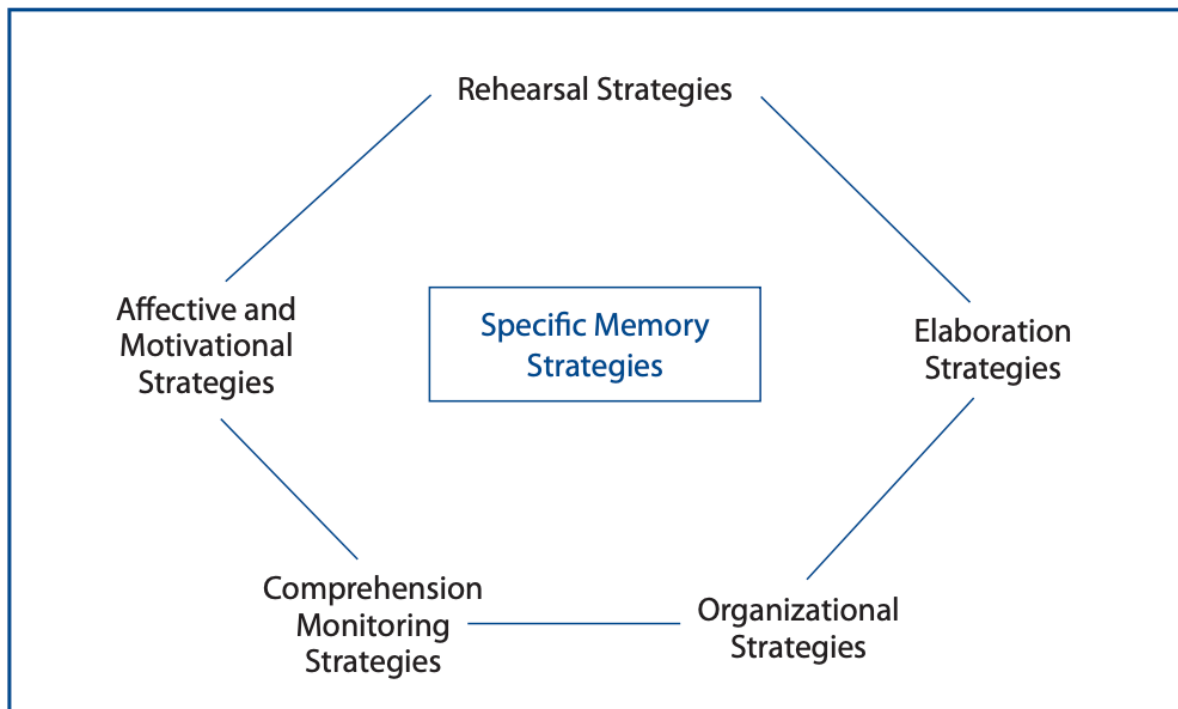
c. Repetition

Each time you write, recite, or even think about a particular concept, you practice opening one of those drawers in your LTM filing cabinet and putting that information in the correct folder. The more times you open that same drawer and pull out that same folder, the easier it is to do it the next time; you know just where to go in the LTM warehouse and exactly where in the filing cabinet to look. If you continue to practice that same material over a period of days, you'll be able to strengthen and maintain your memory of it.

d. Overlearning

Overlearning involves continuing to work on material even after it's learned—after it's stored in LTM. This practice is very helpful in improving your memory. Each time you review the material, you reduce forgetting and strengthen the path to your LTM. Overlearning may lead you to review the material in other ways, so you may form different cues for, or associations with, the material. You may even find that as you continue to work on the material, you gain a better understanding of it. Overlearning information will also help you retrieve the information more quickly, especially if you practice retrieval through self-testing—because you practice using the cues you created to find the answers in LTM. Overlearned material is less susceptible to the debilitating effects of anxiety because it's so firmly embedded in LTM. You can count on overlearned information to help you get started during the exam. Answering questions that cover overlearned information is a good way to use your test time efficiently until you calm down.

e. Rehearsal Strategies



- **Low Rehearsal Strategies**

Reading over material a few times, saying it over and over again, or even copying it several times are examples of low-level rehearsal strategies. They work well for very simple tasks, such as recalling a short list of things. How did you study your spelling and vocabulary word lists in elementary school and junior high? If you wrote them ten times each or recited them over and over again, you were using low-level rehearsal strategies. You may have studied for many of your high school exams by simply reading over the material two or three times until you felt that you knew it. Here again, you were using low-level rehearsal strategies. Although these rehearsal strategies are quite effective for learning simple lists or remembering easy-to-recall information, they're not as well suited to some of the more complex learning tasks that you need to use for college classes. Simply repeating information doesn't always mean that you'll learn it. Take a minute and read

the following lines a few times. Le matin le train est toujours bondé. Quand le train arrive à sa gare il en descend et il monte l'escalier. Now look away from the text and try to repeat the lines. Can you? If you're fairly fluent in French, you may have been able to do so. However, if you don't understand French, you couldn't understand what you just read, so you won't be able to remember it. By the way, the translation is "In the morning the train is always crowded. When the train arrives at his station, he gets out and goes up the stairs." Have you ever read over material for an exam that you really didn't understand? I recall doing exactly that when I took Physics in college. No matter how often I reread the material, I just couldn't remember it because I didn't understand it.

- **High Rehearsal Strategies**

High-level rehearsal strategies such as outlining, predicting questions, and creating charts and concept maps involve **elaborative rehearsal** (repetition that involves making the information meaningful). When you use high-level rehearsal strategies, you're operating on the material—you may be adding information that you already know, organizing the material in a way that's more memorable to you, or creating additional cues to help you locate and recall the material in LTM. In the next chapter you'll learn how to generate questions in the margin of your notes. To make up even one question, you have to reread, write, and think about the material several times—providing you with a significant amount of rehearsal. You're also using high-level rehearsal strategies when you recite information from recall questions or your word and question cards, explain information in your own words, answer review questions, or take self-tests. In a recent study, students who used the high-level rehearsal strategies learned and remembered the information better than those students who used the low-level rehearsal strategies. Those who generated questions or took notes outperformed students who simply read or copied the material on the same test

f. Elaboration Strategies

Elaboration strategies involve expanding on the information, forming associations, or connecting new information to what you already know. Paraphrasing, summarizing, explaining, answering questions, forming mental images, and using mnemonics (“ni-mon-iks”) are all elaboration strategies. Effective note taking requires you to embellish or refine what the professor or the author has said. When you take notes in your own words and add comments or make connections, you’re using an elaboration strategy. One of the chief advantages of elaboration strategies is that they help you create more associations with the material to be learned, thereby providing you with more routes for getting to the information during retrieval. Explaining the material out loud, creating questions in the margin, and making maps also are examples of elaboration strategies that you may already be using. You’ll learn more about how to use those strategies in Chapters 9 and 10. In this section we’ll discuss some other elaboration techniques, including the use of mnemonics.

Mnemonic devices or techniques often are referred to as memory tricks. However, many of these techniques aren’t tricks at all. They are, instead, techniques that can help you remember things when you can’t seem to remember them any other way. The advantage of mnemonic devices is that they form an association with the material, so if you remember the mnemonic, you remember the material. Mnemonics provide an organizational framework or structure for remembering information that may not appear to have a structure of its own. This brings up a very important point. Mnemonic devices are aids to retrieval, but they do not guarantee that you’ll learn the material. You can’t just decide that you’re going to remember Weinstein and Mayer’s five categories of learning strategies by remembering the word REOCA (**R**ehearsal, **E**laboration, **O**rganizational, **C**omprehension monitoring, **A**ffective and Motivational). Before you can use “REOCA” to help you list or discuss these strategies, you have to practice the

connection between the mnemonic and the information to be learned. Although this section focuses on the use of mnemonics, it's important to remember that you must use the other high-level rehearsal strategies to learn the information in the first place. You can then use mnemonics to help you retrieve what you've learned. According to Kenneth Higbee, "A mnemonic system may help you in at least three ways when you're trying to find items in your memory: (1) It will give you a place to start your search, a way to locate the first item. (2) It will give you a way of proceeding systematically from one item to the next. (3) It will let you know when your recall is finished, when you have reached the last item."⁷ You'll learn more about how to make those connections and use mnemonics as retrieval aids as you examine the use of associations, acronyms, acrostics, and imagery.

Association

Forming associations is always important when you're trying to remember something. We use this technique every day. When I was in eighth grade, we were studying longitude and latitude in geography class. Every day for a week, we had a quiz, and I kept getting longitude and latitude confused. I went home and almost cried because I was so frustrated and embarrassed that I couldn't keep them straight in my mind. I stared and stared at those words until suddenly I figured out what to do. I told myself, when you see that n in longitude it will remind you of the word north. Therefore, it will be easy to remember that longitude lines go from north to south. It worked; I got them all right on the next quiz, and the next, and on the exam.

When I tell this story in class, some of my students laugh because it seems silly to them that anyone could get longitude and latitude confused. However, some of us do get confused about things that may seem simple to others. It's very easy to become confused by closely related information. Mnemonic devices help you know for sure which choice is the correct one. Did you ever get confused

about how to spell dessert? You'll never goof on that one again if you remember that dessert has lots of sugar, so it has two s's. Taby re- members it a different way. She noticed that desserts spelled backward is stressed, and the fi rst thing she goes for when she's stressed is dessert. No one taught her that system, but when you can't remember something that you need to remember, you learn to create your own system.

Acronyms, or Catchwords

Acronyms are "words" that are made up of the fi rst letters of other words. Acronyms are so commonly used today that most of us don't even realize that some aren't real words. SCUBA, NASA, FBI, and COD are all quite familiar. We don't even think of them as standing for self-contained underwater breathing apparatus, National Aeronautics and Space Administration, Federal Bureau of Investigation, and cash on delivery; they all are well understood in their abbreviated form. John Langan used the term catchword to describe an acronym.⁸ In a sense, acronyms do help us catch or hold on to the information that we have learned. Catchwords, or acronyms, can be real words or nonsense words designed to aid re- call. You probably can name all of the colors in the spectrum because someone taught you to use the catchword "ROY G. BIV" (red, orange, yellow, green, blue, indigo, violet). "REOCA" also is an example of a catchword; each letter stands for the first letter in a list of other words. Can you say them now? Try it.

How to Create Catchwords.

Catchwords are useful for remembering lists of information. You can use catchwords to remember the following four kinds of fossils:

1. Actual remains
2. Petrified
3. Imprint
4. Molds and Casts

You might create a catchword like "PAIM" (sounds like pain but with an M instead; it would be painful to become a fossil) or "IMAP" (fossils are my maps of the past). In both cases your catchword also provides an association with the material that you learned. You also can use catchwords to remember longer lists of

Information. Five of the general principles of nonverbal communication are listed below. Try to create a catchword to remember them.

1. Nonverbal communication is multichanneled.
2. Nonverbal communication conveys emotions.
3. Nonverbal communication is ambiguous.
4. Nonverbal communication may contradict verbal messages.
5. Nonverbal communication is culture-bound.⁹

To make an acronym or catchword, you first have to identify a key word in each statement. Go back and underline the following words: multichannel, emotions, ambiguous, contradict, and culture-bound. These words should work well as hooks or tags to help you remember the entire list of principles. Next, list (or underline) the first letter of each word: M, E, A, C, C. “MEACC” doesn’t sound as though it will be very memorable, but by simply rearranging the letters you could form the catchword “MECCA” or “CAMEC.” Both of these are fairly easy to recall. Your work isn’t done, though. Can you list the five general principles of nonverbal communication? Just creating the catchwords doesn’t mean that you’ve learned the material. To strengthen the associations and learn the material, you need to practice connecting the catchword to the key word and then the key word to the entire phrase. Reciting or writing will help you form the connections. If I were going to use the catchword “MECCA,” I would rehearse the information this way: “M” stands for “multichanneled,” and “multichanneled” stands for “nonverbal communication is multichanneled.” “E” stands for “emotions,” and “emotions” stands for “nonverbal communication conveys emotions” (and so on). You may need to practice this connection several times. Of course, you still have to be sure that you understand what the terms multichanneled and emotions mean in this context. Students who say that mnemonics don’t work for them often think that simply constructing the mnemonic should firmly embed the information in long-term memory. Unfortunately,

the mere construction of a word or phrase doesn't replace learning the information. Your catchword will help you retrieve the information from memory only after the information is learned

TIP Ten Tips for Improving Your Memory

❑ **Don't assume that you'll remember.** Many students think that they'll remember everything that they read in their textbooks and hear in their class lectures. However, even if it worked for you in high school, it won't in college because college tests are spaced further apart, causing you to forget much of the information. Take good class notes and highlight or take notes as you read and then work hard to learn the information.

❑ **Review regularly.** Review your text and lecture information on a daily or weekly basis to keep the information fresh in your memory. Doing an end-of-week review also allows you to integrate text and lecture material and organize it in long-term memory.

❑ **Organize the information logically.** The more logically you organize the information that you need to remember, the easier it will be to learn it and retrieve it from memory. Restructuring the information so that it's more meaningful to you aids your memory of it.

❑ **Write and recite to move information into long-term memory.** You won't even get information into long-term memory (or at least not very much of it) by just reading over your course material. You have to get actively involved with the material to make it meaningful so that you can learn and remember it.

❑ **Form associations to increase memory cues.** Don't study information in isolation. It's very difficult to recall information when you learn it as an isolated piece of information. By developing study sheets, explaining the material, or making maps, you form associations with and among the material that add a variety of cues that will help you remember it for an exam.

❑ **Organize the information in your study sheets.** The more organized the information is when you put it into long-term memory, the more easily you'll be able to find it when you're taking an exam. Creating titles, headings, and main points in your study sheets helps you organize the information and provides you with cues to aid retrieval.

❑ **Use your own expertise to aid memory.** When information is meaningful, it's easier to remember. Think of how what you're learning connects with your own life and work experiences. Create examples from your own experiences to help you remember the information you're learning in your college classes.

❑ **Use mnemonics to aid memory.** Mnemonics can be used very effectively to aid retrieval. However, unless you learn the information to begin with, mnemonics won't work. You also need to practice the connection between the mnemonic device you create and the actual material you want to remember.

❑ **Use rhymes, stories, or songs to help you remember.** If you're good at writing or remembering songs, rhymes, or stories, use those methods to help improve your memory. Words that rhyme, the details of a story, or even the melody of a song add additional cues that may help you remember information for your exam.

❑ **Monitor your memory.** Many students are frustrated when they can't remember information during an exam. If this has happened to you, you may not have *learned* the information (at least not at the recall level). Check your memory of the information before the exam by self-testing on paper or by reciting. If you can't say the answer out loud without peeking, you don't really know it.

When to Use Catchphrases. Catchphrases are especially useful if you have to remember the information in a special order or if you can't form an easy-to-remember word from the letters available to you (for instance, you may have all consonants but no vowels). You can create catchphrases to recall all kinds of course material. Remembering lists of names, steps in a process, causes and effects, and key points for essay answers are just a few ways that students use catchphrases.

How to Create Catchphrases. You can create catchphrases in much the same way you created catchwords. If you had to learn the five principles of nonverbal behavior in order, you might find that "Mary Ellen Answered Conrad Curtly," is more memorable than "MEACC." This example can provide us with some additional tips for creating acrostics, or catchphrases. You may have noticed that in the example ("Mary Ellen Answered Conrad Curtly"), the two *c* words have the same second letters (the vowels *o* and *u*) as the original key words (*contradict* and *culture-bound*). When you have two key words that start with the same letter, it's helpful to use the second letter to show which one comes first. You may also find that making your mnemonic sentences outrageous, silly, or humorous helps you remember them. We tend to remember funny or outrageous catchphrases better than dull and boring ones.

Whenever you're creating catchphrases to help you remember text material, use the following six steps:

1. Make a list of the information you need to learn.
2. Select a key word to represent each piece of information.
3. Underline or write down the first letter of each key word.
4. Form a catchphrase from words beginning with the first letter of each key word.
5. Practice associating the words in the catchphrase to the key words and then the key words to the actual information that you need to know.
6. Use the mnemonic to test your memory—to retrieve the original information.

g. Organisational Strategies

Organizational strategies allow you to organize the information to make it easier to learn and recall. Tasks such as listing, ordering, grouping, outlining, mapping, charting, and diagramming are all examples of organizational strategies. In each of these activities, you act on the material that is to be mastered. With outlining, charting, or mapping, for example, you organize the material in a way that shows how each component is related to the others. One of the advantages of organizational strategies is that by structuring the material, you provide yourself with new ways to remember many of the details. If you can remember the structure—the main headings of the outline, the categories in your chart, or the web strands of your map, for example—you'll be able to remember many of the details. Before you continue reading, these activities, you act on the material that is to be mastered. With outlining, charting, or mapping, for example, you organize the material in a way that shows how each component is related to the others. One of the advantages of organizational strategies is that by structuring the material, you provide yourself with new ways to remember many of the details. If you can remember the structure—the main headings of the outline, the categories in your chart, or the web strands of your map, for example—you'll be able to remember many of the details. Before you continue reading, complete A Did you find that grouping made it easier to remember the words in Activity 4-7? Did you use any other strategies for remembering? You may have used some rehearsal and elaboration strategies. You may have used a catchword such as "BAPT" to help you remember bus, auto, boat, and train. Did you notice that the second column contains two words that start with p and two words that start with c ? Can you think of a catchphrase that would help you remember the four "things you read"? You might find that you could learn and recall the fifty states more easily if you classified or grouped them into

categories such as New England, Mid- Atlantic, Southern, Midwestern, Western, and so on.

Try Some Organizational Strategies

Look at the following list of words for sixty seconds; then cover it with your hand or a piece of paper and try to write the words in the margin.

Newspaper, pencil, bus, automobile, book, pen, boat, magazine, comic book, chalk, crayon, train

You may have found that it was difficult to remember all twelve of the items. Do you know why? Earlier you learned about the capacity of short-term memory. If you recall, you can remember only about seven pieces of information at one time. You can, however, increase this capacity by chunking (grouping) the information. You probably will be able to remember all twelve items if you group them as follows:

THINGS YOU READ	THINGS YOU WRITE WITH	THINGS YOU RIDE IN
newspaper	pencil	bus
book	pen	automobile
magazine	chalk	boat
comic book	crayon	train

With this grouping, you have three pieces or chunks of information to remember instead of **twelve**. It's easy to remember three things, right? You also can remember the four items in each category quite easily because the headings help trigger your memory. Now look at the three groups for sixty seconds and try to write down as many of the items as you can in the margin.

Organize Material by Grouping

You can improve your ability to learn and recall a large amount of material by grouping or chunking it. However, you should follow some basic guidelines when setting up your groups. First, never set up more than seven groups. Why? If you make up ten or fifteen groups, you won't be able to remember all the group headings. For the same reason, limit the number of items in each group to seven. Second, be sure you use a simple system. If your plan for remembering the information is extremely complex, you won't be able to remember it (the plan), and then you won't be able to remember the information itself. Third, you can't learn the information just by looking at it. You need to write or recite the lists

and then test yourself. Finally, there's a tendency to forget the items in the middle of the list more quickly than those that are first or last. Did you have that problem earlier? You can avoid this problem by practicing the items in a different order or by using some of the elaboration strategies previously described. Remember, the more organized the information is when you put it into LTM, the more easily you'll be able to retrieve it later. Before her exam in Computer Literacy, Heather organized the information on the five different programming languages by using the informal outline and mnemonic sentences in Figure 4.5. She pulled the important information out of her text and notes and structured it in such a way that she could learn and remember it. Then she created catchphrases to prompt her memory. Her first sentence, "Corey Finds Bobby Playing Alone," provides hooks for the five programming languages. The other five sentences are designed to help her remember the details about each language. By organizing the information and practicing the connections between the catchphrases and the material she wanted to learn, Heather improved her ability to recall the information.

	Computer Programming Languages	
Corey	1. COBOL	Corey
	– widely accepted	wins
	– English statements, business applications	every
	– processes, records, produces	program.
Finds	2. FORTRAN	Fanny
	– solve science, math, engineer problems	Smith
	– programming	plays
	– widespread use, science – engineer	walleyball
	communities	Saturdays.
	– solve problems	
Bobby	3. BASIC	Bobby
	– teaching tool	tells
	– easiest	everyone
	– programming language	Pat
	– Apple, IBM	ate
	– data structure – FORTRAN	dirt.
Playing	4. PASCAL	Pat
	– preferred teaching language	prefers
	– teaching tool	tulips.
Alone	5. ADA language	All
	– general purpose	girls
	– most advantages	must
	– structures – PASCAL	stay
	– strong type	strong.

- **Information Before Taking Notes**

Consider the Content

Evaluate your notes from Activity 5-2 according to two main criteria: content and organization. First, consider the **content** that you recorded in your notes. Did you get an accurate record of the information? The best way to figure out if you're taking good notes is to find out whether you're getting down the information that you'll need to master the material and to review for the exam. This is not easily determined in one attempt. Throughout the chapter, you'll be given opportunities to evaluate the content in your notes.

One way to judge the content of your notes is to compare them with those of other students in your class. If you're fairly new at taking notes, you may want to get together with a classmate and compare notes. By reading your notes and following along in your classmate's notes, you may be able to determine whether or not you're getting all the information that you need.

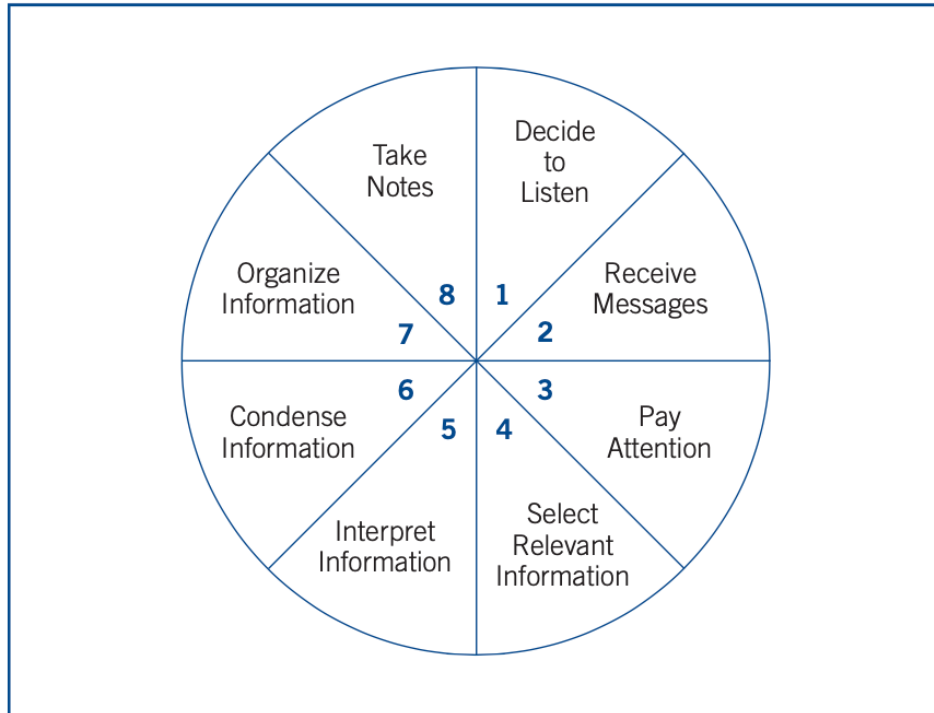
Another way to evaluate the content of your notes is to compare the information in your notes with the information in your textbook (assuming your instructor follows the text). You also can evaluate the completeness and accuracy of your notes after you take a quiz or exam on the material. Look back at your notes to see if you were missing or had inaccurate information that contributed to the errors on your test.

Consider the Organization

Organization—the way you structure the material—is the second criterion for how “good” your notes are. If you try to write down everything without organizing the information, you may find yourself with a jumble of unrelated facts and ideas. It's important to separate main points and details and to show the relationships between clusters of information in your notes. You'll learn more about how to organize your notes later in this chapter. Remember, the more organized your notes are, the more easily you'll be able to study from them.

Prepare Before Taking Notes

Before you ever walk into a lecture class, you need to prepare to take notes. The best way to prepare for your note-taking activity is to read the text assignment before class. Much of the material that's presented in college lectures will be new to you. By reading the text assignment before the lecture, you can build up some background about the topic. If you have some idea what the lecture is about, it will be easier for you to understand the presentation and take good notes. Reading before the lecture also will give you the opportunity to become familiar with the main topics or ideas that will be presented. You'll find it easier to identify main ideas and organize your notes as the professor delivers the lecture. Finally, you'll be somewhat familiar with key terms and names after reading the text. This will help you keep up with the



lecturer and avoid making content errors in your notes. If you've been having difficulty understanding the lecture or taking notes, try reading your text assignment before the next lecture. Remember, you only get one chance to listen to the lecture, but you can read the text as many times as you want.

As you walk into the lecture classroom, get ready to take notes. If you sit near the front, you'll be able to see and hear better. You'll probably find that other interested and motivated students also tend to sit in the first few rows of the class. By avoiding the back of the room, you'll avoid those students who tend to chat and walk in late. While you're waiting for class to begin, review the notes that you took during the last class meeting. Many professors pick up where they left off in the last lecture. Your review will remind you of the main topics and the general organization of the lecture and will prepare you for the next point that will be made.

The Informal Outline

Many students use outlining to take notes in lecture classes. **Outlining** involves indenting each level of supporting details under the preceding heading, subheading, or detail. One of the reasons this style is so popular is that it's familiar to many students. Is this the style that you're using now? You probably learned formal outlining in school and feel comfortable putting information into outline form. Some students use outlines because their professors provide them with some form of outline at the beginning of the lecture. Even the four- or five-point outline written on the board can set the pattern that you

use for taking notes. Outlines work, however, only when the lecturer is well organized and proceeds in an orderly manner from main points to supporting points.

You can effectively use an outline style of note taking as long as you are careful not to fall into several traps. Don't get distracted by the "rules" of formal outlining. You could spend so much time thinking about how you should label or designate the next point in your notes that you miss some of the content. You may find yourself thinking about whether you should write a "B" or a "2" in your notes instead of concentrating on the content of the lecture.

Too often, students equate outlining with just writing down key words. One-word outlines (Figure 5.3) contain too little of the content of the lecture to provide an accurate record of information. As you can see, there's not enough information here to answer test questions on any of the topics. Sometimes students don't realize how little information they have in their notes until they look at another student's notes. Look at the sample notes in Figure 5.4, which were taken by two students in the same Economics class. Gary simply wrote down key words. His notes look well organized and effective until you compare them with the notes taken by Bryan. Bryan's notes contain much more information about the topics presented in the lecture. Bryan included **meaningful phrases**, condensed versions of the statements made by the professor that still contain the critical concepts that were presented. When it's time to prepare for exams, students with "one-word notes" simply don't have enough information from which to study. Which set of notes would you rather have before the exam?

If you do plan to outline as you take notes, use an informal outlining style (see Figure 5.5). After writing the main points next to the margin line, just use indentation to show that the next points are subordinate. (Instead of aligning the next point with the sentence above, move it in a little from the lefthand side.) If your professor numbers points as he or she is speaking, by all means, include the numbers. But don't try to make your professor's lecture or your notes adhere to a formal outline style.

The Block Method

The block style of note taking is another very simple system to learn. Block notes are especially useful if you need to record a great deal of information very quickly. Do you have a professor who talks so fast you can't keep up? Who never goes back over information? Who never seems to pause to catch his or her breath? When taking block notes you need only to write down the heading and then focus on writing as many details as you can. **Block notes** are written continuously across the page, separating the details by dashes (—) or slashes (/). Demonstrating the

block form, Figure 5.6 contains a set of notes from part of the lecture on Intellectual Development. The headings from the lecture stand out because they're next to the margin, whereas the details are clustered together in a block indented slightly under each heading. Remember, you don't have to write complete sentences just because your notes are shaped like a paragraph; instead, you want to concentrate on using meaningful phrases. By skipping a line or two between each main heading, you can organize your notes and leave room to add something later in the lecture.

The Modified-Block Method

Some students are uncomfortable putting all their notes in block form. If you like the idea of having all of the information grouped under a heading without showing various levels of support as in an outline, you may prefer to use a modified-block format. To use **modified-block notes**, you would simply indent about one-half inch and list all related details straight down the page under each heading. You would take each of the details clustered under the heading "Development of Perception" and list them individually, one statement per line (Figure 5.7). If you look again at the notes in Figure 5.7, you may notice that a few lines of notes are indented. You can create sub-headings when you need to and still use modified-block format for taking notes.

Although most of the details are listed at the same level, it's okay to indent to show details for an occasional subheading. Having each detail on a separate line makes it easy to take notes, organize them, add recall questions, and review for the exam.

The block and modified-block methods allow you to take notes efficiently and effectively because you have to concentrate on only two things: (1) writing down the main points (headings) and (2) writing down any details about them. You don't have to spend a lot of time trying to figure out where to place or how to label each new piece of information.

What to Include in Your Notes

Although some general rules will help you figure out what to include in your notes, there's no simple answer to the question "What should I write down?" Some students are so afraid that they'll miss even one point during the lecture that they try to write down every word the professor says. This is both impractical and ineffective. You can't write as fast as your professor can talk. A good general rule is to treat a lecture class like a lab class. You should be an active participant during the entire period. The best thing to do is to take as many notes as you can in a well-organized format. As soon as you pick out the heading, listen carefully for any information that explains or expands upon it, and add that information to your notes. Have you ever caught yourself thinking, "I wonder if I should write that down?" Anytime

you think about whether to write something down, go ahead and write it down. You may even find that your fingers feel sore from typing or your hand hurts at the end of the period; that's fine. *Remember: When in doubt, write it out.*

Headings

Always note all **headings**—the main points—that are made during a lecture. You may find that sometimes you have no trouble at all identifying the main points, and other times you have a lot of trouble. Main points appear to be obvious during some lectures because the lecturer states them in an easily recognizable manner. Introductions such as "The next thing we're going to talk about is . . .," "Another reason is . . .," "What about vision?" and "First of all, . . ." make main points easy to pick out. Listen during your next lecture and see how your professor introduces each main topic. If your professor puts an outline on the board, you may want to copy it into your notebook right away. However, as each main topic comes up during the actual lecture, write it down again in your notes.

Nonverbal clues may help you decide what's important in a lecture. Some lecturers unconsciously stress certain points by altering their voice level, changing their position in the classroom, or gesturing. If your professor raises his or her voice, you may be getting a signal that a main point or test answer is being presented. Some professors move away from the podium and toward students when they present key points during a lecture. Others point to specific information that is written on the board, clear their throats, or look at their notes before presenting key information. Do any of your professors use these methods to signal important information during a lecture?

Details

After you write the heading in your notes, listen for all of the **details**, the points that support each heading the professor presents about that topic. Until you develop more sophisticated note-taking skills, you may want to focus on the following details:

1. Any facts or explanations that expand or explain the main points that are mentioned
2. Definitions, word for word, especially if your professor repeats them several times
3. Enumerations or lists of things that are discussed
4. Examples; you don't need to note all of the details for each example, but you do need to know to which general topic (heading) each example relates
5. Anything that is written on the chalkboard, on a PowerPoint slide, or on a transparency (on an overhead projector)
6. Anything that is repeated or spelled out
7. Drawings, charts, or problems that are written on the board

Discussion Classes

Many professors prefer the discussion format when teaching. They could very easily just “tell” students the information, but they prefer to allow the information to emerge through a guided discussion. Even though the material is presented in a different format, the information often will still appear on tests.

You can easily take notes on a discussion. Instead of writing down the main heading, write down the question that’s posed. Then jot down the various points that are made during the discussion. Remember, it’s very important to indicate who made which point in the discussion. The easiest method is to simply write “P” in front of any statement made by the professor and “S” in front of any statement made by a student.

Math and Science Classes

Taking notes in math and science classes requires special strategies. The modified-block method probably will be more effective than the outline method because you’ll need to include many problems and drawings that are written on the board. You may not think that you need to write down all problems that the professor puts on the board, but you should. Even more important, however, you need to write down what the professor says *about* the problems. Get into the habit of writing the name or type of problem first. Then copy down the problem and take notes on steps to follow, tricky areas, what to do first, and even why you should do it. Think of the explanations about a particular problem or model as minilectures. You may find it helpful to write the problem on the left side of the note page and

anything the professor says about it directly across from each step. Listen carefully for the main points and the important details and put them in your notes.

PowerPoint Presentations

Many professors use PowerPoint presentations (which incorporate a series of “slides” containing main points, details, diagrams, and examples) to enhance their lectures. In addition to showing each “slide” on a large screen, many of them pass out a paper copy to their students with space for notes. As you can see from Rhonette’s notes (Figure 5.8), there isn’t much space to write down all of the information. Rhonette only wrote down two of the definitions during the lecture. She didn’t have room for the five other details she listed in her notes. Instead of taking notes on the handout sheet, use it to organize your notes by copying the headings and subheadings into your notes as the professor refers to them. Then listen to what the professor says about the “slide” and take notes. Leave space in your notes to tape in the “slides” showing diagrams or problems (make a note with the name for each).

If you’re taking notes on your laptop, you need to list the name and number of the slide in your notes and then type anything your instructor says about the slide. When you are ready to print out your notes, add some blank space after the slide number and tape in the slide on the printed page.

Online Lecture Notes

Some professors choose to post their lecture notes on their course Web sites. Some post the notes prior to the lecture so that students can sit back and listen in class or feel more comfortable participating in class discussions. Others post their notes after the lecture so that students will have all of the information that was presented in class. This has led to some confusion for students. My students ask me whether or not they really need to take notes in class when they can simply print them out. My answer is always, yes you do. As you learned earlier in the chapter, you benefit in many ways when you do take notes. You are actively engaged in the class, you can condense the material, you can organize the material your way, and you can put the information in your own words. You can use the professor’s set of notes to build some background prior to the lecture. Then after you take notes, use the online notes to edit your notes. You’ll learn more about how to edit in the next section.

EDITING YOUR NOTES

Taking good lecture notes is only the first step in the note-taking process. After you leave the classroom, you need to **edit**, revise your notes to correct errors, clarify meaning, make additions, and improve organization. Editing is a fairly easy process once you know how to do it. Early in the term or semester you may spend a lot of time making corrections or additions to your notes. You may need to reorganize your notes or rewrite them to make them useful. You'll soon benefit from these editing experiences, however, and your ability to take good notes will improve. You'll probably find that by the second half of the term, you won't need to spend nearly as much time editing, and you can instead devote that time to more active review of your notes.

Why You Should Edit Your Notes

Editing your notes helps you become a better note taker because you get feedback on the quality of your notes. As you go through your notes to check for accuracy, fill in gaps in information, and improve the organization, you can see where you made mistakes. This feedback can help you become a better note taker. Without knowing what types of errors you tend to make, you may not make changes in your preparation, attention, or note-taking style. Editing also helps you hold yourself accountable. If you know you're going to check your notes after the lecture, you'll take better notes during the lecture.

Editing also helps you be better prepared for exams because you will have an accurate record of the information. Because most test questions tend to come from lecture notes, it's important that you have a complete, accurate, and well-organized set of notes. Finally, editing provides you with an opportunity to review both the text and lecture material, giving you a chance to integrate the course material. This additional repetition (which requires both critical thinking and an active restructuring of the material) helps you reinforce what you read and heard, leading to a better understanding of the material.

Edit your lecture notes as soon after the lecture as you can, but certainly within twenty-four hours. If you wait much longer, you won't remember the lecture well enough to make any necessary additions or corrections in your notes. Look back at your Fixed Commitment Calendar and set aside a certain time each day to edit and review your lecture notes. In as little as half an hour, you can turn "so-so" notes into excellent notes.

How to Edit Your Notes

As you edit your notes, you should fill in gaps, check for accuracy, clarify meaning, rewrite to improve organization, and add recall questions in the margin.

Fill in the Gaps

The first thing you should do is read through your notes and fill in any missing information that you can recall from memory. As you read your notes, the lecture will "come back" to you. You may be able to add a few words to further clarify a point, fill in additional details, or even add information that you didn't have time to record during the lecture. Look at Nikki's edited Life Science notes

	1/22
	(3) Decomposers
What are decomposers?	- heterotrophs - get nourishment from other organisms - do not have digestive tracts
	(4) Scavengers
What are scavengers?	- let something else kill organism - bacteria that break down dead tissue
	(5) Waste feeders
What are waste feeders?	- type of scavenger
What do they feed on?	- feed on dung, feces, undigested food
	- have digestive systems
	- eat food
	Ex: Egyptian scarab beetles
What is detritus?	detritus – miscellaneous organic material passing by
Give two examples.	- mixture of decaying organisms + dung w/partially digested food - Land – mixes w/soil – earthworms/soil insects eat - May float or settle on bottom
	(6) Filter feeders
How do filter feeders eat?	- pass water thru comb-like feeders - take things floating in water - may use mouth parts, gills, special limbs
	Four types of consumers are decomposers/scavengers, waste feeders, and filter feeders. Detritus is a mixture of decaying organisms + dung along with partially digested food.

in Figure 9.9 and Todd's edited Accounting notes in Figure 5.10. Both Nikki and Todd added some additional information (shown in blue) after the lecture. Nikki also added a brief summary of the key information in the bottom margin of her notes.

You also can refer to your textbook to help fill in gaps in your notes. If you still feel your notes are incomplete, you may need to use a friend's notes to expand on the ones you took in class. If you recorded the lecture, listen to the recording and fill in the information you weren't able to write down during the lecture.

Check for Accuracy

As you go through your notes, you also need to check for accuracy. If you notice some incorrect information in your notes or if you're unsure of the accuracy of some points, check with the professor or a friend or use your textbook to verify whether the information is correct. If you find that some of your information is incorrect, change it. Some students lose points on exams because they have incorrect information in their notes. Even though they study for the exam, they still get questions wrong because they've been rehearsing inaccurate information.

● What are corporations?	Corporations- legal entity having an existence separate and distinct from that of its owners
What rights does an artificial person have?	- Artificial person - same legal rights as a person - can be such, can sue - assets of corporation belong to a corporation itself, not to stockholders.
Who owns the assets of a corporation?	
What are 5 advantages of a corporation?	Why have a corporation? (Advantages) 1. No personal liability for stockholders 2. Ease of accumulating capital 3. Ownership shares are readily transferable 4. Continuous existence - lives on forever 5. Professional management
What are the limits of risk for stockholders?	- amount of money stockholders risk is limited to the amount of their investment
●	
What are the 3 disadvantages of a corporation?	Disadvantages of having a corporation 1. Heavy taxation - tax twice, when they earn and pay income- double taxation
What is the role of the owner of a corp.?	2. Greater regulation 3. Separation of ownership and control - guy who owns corporation doesn't run it
What is double taxation?	Double taxation - First taxing corporate income and then taxing distributions of that income to stockholders

Clarify Meaning

You may find that some of your notes are cryptic or hard to understand. To make your notes more readable and understandable, you may need to expand some abbreviations, finish some words, or correct spelling errors. If you use a lot of abbreviations or shortcuts in note taking, you should try to clarify some of them while you still know what words they represent. For example, if you wrote “priv” in your notes, you may want to add on “ileged” after class, because “priv” is not a common abbreviation and you may become confused about what you meant when you review your notes at a later time. It’s not necessary, however, to go back and add on the tail ends of all words that you shortened or abbreviated. For example, the abbreviations “w” and “w/” are commonly used to stand for “with,” so there would be no need to write out the word.

Rewrite to Improve Organization

You may need to rewrite your notes in order to improve the organization of the information. If you took notes on a lecture that was poorly organized, your notes may be disorganized, too. Even though you may have an accurate record of the

information, you may find it difficult to study. By reorganizing the information in your notes, you can clarify the relationship between the main points and the supporting details. You may need to add headings or make the headings that you have in your notes stand out. You can do that by writing the headings next to the margin and then indenting the subordinate points. You also may need to reorganize your notes in order to group together related information. If your professor tends to jump from point to point during the lecture, you may find that information on the same topic is scattered over several pages in your notes. As you rewrite your notes, group these points together under the appropriate heading. Reorganizing and editing your notes will make your notes more useful when you’re ready to study for the exam.

Compare Amy’s original Geography notes (Figure 5.11) to her revised notes (Figure 5.12). All the information in blue was added after the lecture. What changes do you see that improved the overall organization of the information? What other changes did Amy make as she edited her notes? Which set of notes would you rather study from?

Another way to organize your notes is by using concept maps, diagrams, charts, and matrixes to show the relationships between main points and supporting details. You may find that you can restructure some or all of the information from the lecture into a visual display that’s easy to picture and recall for exams. Creating maps, diagrams, and charts is an active-editing process. You’ll learn more about these strategies in later chapters, but if you think this is something you would like to try now, refer to Chapter 9 for some tips.

	2/21
	Canada
	
What rank (in order of land size) is Canada?	General Information
When did Canada become self-governed?	2nd largest country in world
In the 1960s which city became the capital?	Became self-governed in 1901 after French & Indian War
? % of population lives on ? % of the land?	Constitution recognized Ottawa as capitol in 1960s
How many people occupy Canada?	Population
What % of pop. lives w/in 155 mi of U.S.?	60% of population lives on 2.2% of land
What bodies of water do most Canadians live by?	30.6 million people
The province Nunavut was created for what purpose?	ex: fewer than state of Calif (33 million)
	85% lives w/in 185 mi of U.S.
	Most of pop. in S. Quebec & Ontario/
	Middle Manitoba/Saskatchewan, &
	Alberta/S. British Columbia/All along
	Great Lakes & St. Lawrence River
	1999 – New province – Nunavut/created for
	Aboriginal Canadians (Eskimos)/called
	“First Peoples”
	Language
What % of Canadians speak English? French?	English as Mother Tongue/many French
	59% speak English/24% French/16% other
	(primarily Chinese)/1% speak First Peoples
	Land
How much of Canada is permafrost?	1/3 land is permafrost
	part of inhabited land is permafrost
	10%/yr
What forest extends the whole way to Asia?	Boreal Forest – coniferous trees/extends
	to Russia, China, Scandinavia

Develop Recall Questions

Adding recall questions in the margin helps you learn the information in your notes. **Recall questions** are questions you write that can be answered by the important information in your notes. The process of making up these questions forces you to identify the information that you'll need to learn and to condense the information down to its essence. These questions then serve as cues to prompt your memory as you study for quizzes and exams.

	Learning
	Learning def.
What is learning?	change in behavior resulting from exper
	Habituation
	Simplest form of learning
What is habituation?	no response to a stimulus after repeated exposure
Give an ex. of habituation	ex: bird no longer afraid of scarecrow
	highly adaptive
What does habituation allow animals to focus on?	allows animals to focus on relevant things
	Imprinting
What does imprinting involve?	involves both innate behavior & experience
What type of learning is imprinting?	learning that is irreversible
What is the result of imprinting?	results in a strong bond between new offspring and parents
When does it occur?	occurs at a specific period in an animal's life
What is the name of the period when certain learning behaviors can occur?	Sensitive Period
	phase in an animal's life when the learning of certain behaviors occur.
Who studied imprinting in geese?	Konrad Lorenz
What kind of geese were used?	used greylag goose to demonstrate imprinting
How did he conduct the experiment?	divided batch of eggs, some to mothers some in incubator
What was the control group?	control group: ones with mother
How did the geese in the control group act?	showed normal behavior and interacted with other geese

Note: The answers to the questions are highlighted in blue.

Writing recall questions is also an effective strategy for editing. After you identify a key point that you want to remember for your exam, develop a question to which that point is the answer. Be sure to write the question directly across from the “answer.” You may find it helpful to highlight the answers. Developing both broad and specific questions will help you learn the information in different ways. Of course, the more questions you write, the more effectively you can use them to study the information in your lecture notes. Questions have been added to the recall column for the notes in Figure 5.13. Notice the wide variety of questions that Carrie used and how she shaded each of the answers. Refer also to Nikki’s, Todd’s, and Amy’s notes (Figures 5.9, 5.10, and 5.12, respectively), which also include recall questions in the margin.

REVIEWING YOUR NOTES

Reviewing your notes is the final step in the note-taking process. Even though editing your notes provides you with an initial review of the lecture material, you need to review (study) your lecture notes on a regular basis in order to store and maintain the information in your long-term memory. You can review your notes when you're waiting for your next class to begin. You may want to set aside an hour or two each weekend to review the notes that you took in all of your classes during the week. If you've been reviewing daily, you'll need only to test your memory (using the recall questions) during your weekly review. Reviewing your notes frequently during the term or semester will keep you actively involved in the learning process and will reduce the amount of time you need to study before exams.

Three Ways to Review

The best way to review your notes is to recite the information—to say it out loud. Just reading over your notes is a very passive activity. Reciting also helps because you may learn more by hearing information than just by seeing it. Use the headings in your notes and the recall questions that you created to test your memory of the information. This self-testing will let you know whether you really do know the information in your notes.

Recite from the Headings

You can review your notes by using the headings or topics to prompt your memory. After you review your notes by reciting them aloud, cover the information under each heading and try to recall all of the points related to that topic. Try to explain or recite aloud all of the details you can remember about each of the headings in your notes. Then check your notes to see whether you missed anything. If you study in a place where you can't recite out loud, you can accomplish the same thing by mumbling quietly to yourself or by writing out the information from memory. Repeat this process until you know all the information in your notes. This review method helps you learn the material in an integrated (connected) way. You need to learn the material in a connected way in order to answer essay and many short answer questions. You may also need to know information in an integrated way to answer some multiple-choice or true/false questions.

Recite from the Recall Questions

When you think that you know the information in your notes, use the recall questions to test your memory of the main points and supporting details. Put your hand or a piece of paper over your notes so that you can see only the recall questions. Then recite the answers out loud. If you can't say the answer out loud, you may not really know it. Continue practicing until you know them all. This review method helps you learn the material in an isolated way—you learn specific answers to specific questions. Learning information in an isolated way also helps you distinguish between closely related information. During the exam, it's easy to confuse two terms, for example, that you studied which are very similar. Although you may not be able to answer essay questions and some short answer questions, you should be able to answer multiple-choice, true/false, completion, and matching questions by reciting the answers to your recall questions.

TIP**Additional Strategies for Taking Lecture Notes**

- ❑ **Don't rely on your memory alone.** Many students think they should be able to remember the information presented in a lecture if they pay careful attention. Unfortunately, we tend to forget rapidly. With four to seven weeks between exams, taking notes is critical.
- ❑ **Use a full-size notebook.** Use a separate 8½-by-11-inch notebook for each of your classes. Using smaller notebooks can unconsciously lead to writing fewer notes.
- ❑ **Include the topic in your notes.** By including the topic, you're helping to organize your mind for listening and your notes for later review.
- ❑ **Leave some space in your notes.** By leaving a 2½- to 3½-inch margin on the left side of the page, you'll be able to add recall questions when you edit your notes. Also, leave a blank line or two before you write each of your headings in case the professor adds information later in the lecture.
- ❑ **Use common abbreviations in your notes.** By using some familiar abbreviations, you can get the information down more quickly. Don't use too many abbreviations, though, or you won't know what they mean. See the list of common abbreviations on the Web site.
- ❑ **Skip a few spaces if you miss information.** Skip a line or two and go on to the next point. If you miss a keyword, draw a line and keep going. Ask a classmate or the professor about the missing information after the lecture.
- ❑ **Use a recorder with a counter.** If you choose to record your lectures early in the term, make sure you use a recorder with a counter on it. When you can't keep up with the lecturer and miss information, make a note of the location where the information occurred (the number on the counter) in the margin of your notebook and leave some space in your notes. Later, fast-forward using the counter numbers to fill in the material you need.
- ❑ **Play recorded lectures while you commute.** If you have a long commute to and from school, you may want to record the lectures for your most difficult classes. Then you can listen to them while you drive or ride the bus or train. The additional review may help you improve your understanding of the material.
- ❑ **Find a note-taking "buddy."** Many students have to miss class due to illness or emergencies. Set up a plan with one of your classmates to let you copy his or her notes in case you're absent. Exchange phone numbers or e-mail addresses to check on any upcoming assignments or scheduled exams.
- ❑ **Reduce distractions.** Keep your head down and focus on your notes. Look up to see what's on the board, on the screen, or when the professor changes his or her tone of voice. You can reduce distractions and improve your concentration when you focus on your notes.

- **Feynman Technique For Technical and Non-Technical Course**
 - I. **Choose a concept and Write At the TOP Page. Select a topic you're interested in learning about and write it at the top of a blank page in a notebook.**
 - a. **Write What You do Know About The Topic or Concept. Write what you know, as if you were explaining to yourself.**
 - b. **Write What you Do not Know About The Topic or Concept. You need to be specific. Given the accumulated knowledge in the universe, most of us know nothing about most things! Writing down explicitly what you don't know provides you with a starting point.**
 - c. **What Book Explains the Best About This Topic.**
 - d. **You have to start small. You really only have a page (or a few) to fill up with information. You can't fit everything there is to know about "Evolutionary Science" or "Microeconomics" or "Psychology" on a page. Instead work on smaller more defined concepts or what might reliably be found on a midterm or final exam.**
 - e. **Fully understand the complex topic first: Don't begin the learning process by explaining it before you actually understand it. Retention methods such as Feynman technique, active-recall and spaced repetition are for solidifying information that you already understand. Trying to solidify an information before you understand it might end up encoding wrong interpretation of a topic.**
 - f. **Actually put the time and effort: Once you have selected the correct set of topics, make sure you actually spend the time and effort to go through the entirety of the techniques. Feynman technique is great for having a basic framework of the topic inside your head with the details chopped off. It's important to get a very clear picture of the basics in your head right - the details can be filled in later.**

g. Make it your own.

- Start with not knowing.
- Ask 'why?'. ask why $x=y$. or why does music has 12 notes and not 14.
- Study the story of what you are studying. E.g. study what was physics before Quantum theory. Why QT was needed, who were the people involved in developing the QT and how it changed the world.

h. Take Notes On the Topic From Study.

- i. Consolidate the information concisely onto a flashcard or some other place for long term retention: Once we really understand a topic to be able to explain the core principles without having to use jargon, we should hold onto that understanding. Unfortunately, a large portion of that information that we just gathered is lost within first 48 hours after learning. So note it down somewhere before you lose it. Optimise for spaced-repetition for next sessions.
- j. Don't write notes on notes: Life is short.

II. Simplify The Topic For Myself First.

- a. Simplify your explanation so that YOU understand it. As long as the explanation is not simple enough for YOU to understand, spend more hours to break it down to basic, bare-bone, core ideas.
- b. Avoid jargon and complexity. The simpler the explanation, the more likely you are to remember it.
- c. Only Use Simple Words. The words a child would understand.
- d. Anyone can make a subject complicated but only someone who understands can make it simple. Jargon hides our lack of understanding. When forced to write out an idea from start to finish in simple language, you discover where you struggle, where it doesn't quite make sense, where you get frustrated, where you don't really understand as well as you thought. Only by identifying gaps in your knowledge can you fill them.
- e. But true understanding requires a more active process like teaching. Start out by formally teaching yourself. Write out a summary in your own words without looking at your notes. Or explain it to yourself out loud. Then take it to the next level by teaching other people. Teaching also initiates a feedback loop, where critique or questions can help us learn and sharpen our thinking.
- f. **It makes it harder to trick yourself.** When you have to truly explain something, whether through writing or aloud, you encounter the holes in your reasoning and the white spaces in your knowledge. Think of writing and teaching as a process to obtain understanding, not something you do once you already understand.

III. Reflect, Refine, and Simplify

- a. Only when you can explain the subject in simple terms do you understand it.
- b. Simple is beautiful.
- c. Review your notes to make sure you didn't mistakenly borrow any jargon or gloss over anything complicated.
- d. Read it out loud as if to a child. If the explanation isn't simple enough or sounds confusing, that's a good indication that you need to reflect and refine.
- e. Go back to the source material, reviewing the parts you don't quite understand yet.
- f. Repeat until you have a simple explanation.

IV. Teach it to yourself or someone else. Write everything you know about a topic out as if you were explaining it to yourself.

Alternately, actually teach it to someone else.

V. Return to the source material if you get stuck. Go back to whatever you're learning from – a book, lecture notes, podcast – and fill the gaps in your knowledge.

VI. Simplify your explanations and create analogies. Streamline your notes and explanation, further clarifying the topic until it seems obvious. Additionally, think of analogies that feel intuitive.

- a. Every field of study has its own specialised terms. While it may be important to know them, it's also important to not confuse knowing jargon with knowing concepts. The Feynman Technique involves simplifying our initial explanations and refining our understanding through simple analogies. Why this step works:
- b. Simplicity is a proxy for understanding. It's easy enough to commit terms to memory, and repeat them back when prompted. But memorisation is not understanding. When we can't rely on big words that make us sound smart, we have to distill what we truly know to the most basic form. This is where true understanding takes place.
- c. Analogies are easier to recall and explain. When you understand a challenging concept, analogies allow you to create a short-hand for recalling it quickly and explaining it to others clearly. Learning material often provides ready-made analogies for us. For example, we all probably have "the mitochondria are the powerhouse of the cell" burned into our collective memories. However, pushing ourselves to create our own analogies is even more powerful than regurgitating a borrowed one that we may not actually understand.

VII. Each it to yourself or someone else. Write everything you know about a topic out as if you were explaining it to yourself.

Alternately, actually teach it to someone else.

- a. Classic learning mistake is reading an article or textbook and considering our learning complete. In reality, reading is not understanding. We might even take notes, essentially transcribing a resource's sentences into our notebooks. We often nod to ourselves, thinking we've grasped a subject. After all, we've taken notes.
- b. Remove any jargon or complexity.
- c. Only Use Simple Words. The words a child would understand.
- d. Anyone can make a subject complicated but only someone who understands can make it simple. Jargon hides our lack of understanding. When forced to write out an idea from start to finish in simple language, you discover where you struggle ... where it doesn't quite make sense ... where you get frustrated ... where you don't really understand as well as you thought. Only by identifying gaps in your knowledge can you fill them.
- e. But true understanding requires a more active process like teaching. Start out by formally teaching yourself. Write out a summary in your own words without looking at your notes. Or explain it to yourself out loud. Then take it to the next level by teaching other people. Teaching also initiates a feedback loop, where critique or questions can help us learn and sharpen our thinking.
- f. **It makes it harder to trick yourself.** When you have to truly explain something, whether through writing or aloud, you encounter the holes in your reasoning and the white spaces in your knowledge. Think of writing and teaching as a process to obtain understanding, not something you do once you already understand.
- g. **It's even harder to trick others.** If an explanation you're providing doesn't make sense, they'll often tell you or you can pick up cues like blank stares. As a test, ask them to repeat what you taught

them in their own words. If they can't do this, your explanation is too complex — simplify it and use plain language.

- h. You build confidence.** When you truly understand something, it clicks. You can explain it forward and backwards, pointing out exceptions and spotting logical inconsistencies. When this happens, it builds confidence and pushes you to tackle even more challenging subjects knowing you have a solid framework for learning.

VIII. Reflect, Refine, and Simplify.

- a.** Only when you can explain the subject in simple terms do you understand it.
- b.** Simple is beautiful.
- c.** Review your notes to make sure you didn't mistakenly borrow any jargon or gloss over anything complicated.
- d.** Read it out loud as if to a child. If the explanation isn't simple enough or sounds confusing, that's a good indication that you need to reflect and refine.
- e.** Go back to the source material, reviewing the parts you don't quite understand yet.
- f.** Repeat until you have a simple explanation.

IX. Return to the source material if you get stuck. Go back to whatever you're learning from – a book, lecture notes, Journal, Newspaper, podcast or any other resource and source – and fill the gaps in your knowledge.

X. Simplify your explanations and create analogies. Streamline your notes and explanation, further clarifying the topic until it seems obvious. Additionally, think of analogies that feel intuitive.

- a. Every field of study has its own specialised terms. While it may be important to know them, it's also important to not confuse knowing jargon with knowing concepts. The Feynman Technique involves simplifying our initial explanations and refining our understanding through simple analogies. Why this step works:
- b. Simplicity is a proxy for understanding. It's easy enough to commit terms to memory, and repeat them back when prompted. But memorisation is not understanding. When we can't rely on big words that make us sound smart, we have to distill what we truly know to the most basic form. This is where true understanding takes place.
- c. Analogies are easier to recall and explain. When you understand a challenging concept, analogies allow you to create a short-hand for recalling it quickly and explaining it to others clearly. Learning material often provides ready-made analogies for us. For example, we all probably have "the mitochondria are the powerhouse of the cell" burned into our collective memories. However, pushing ourselves to create our own analogies is even more powerful than regurgitating a borrowed one that we may not actually understand.

XI. Organize and Review

- a. To test your understanding in the real world, run it by someone else. How effective was your explanation? What questions did they ask? What parts did they get confused about? When you're happy with your understanding, take the page you created with a simple explanation and put it into a binder. Following this technique for everything you learn gives you a binder full of learning that you can review a couple of times a year

Step 5- Invest in “Academic Disaster Insurance”

- **Eliminate Your Question**

- I. **Step 1:** In Step #1, we covered smart techniques for taking notes in class. If you remember, this strategy suggests that you put a question mark in your notes for any topic that flies by without you really understanding the conclusion. This will occur occasionally in both technical and nontechnical courses—sometimes as the result of your attention wandering and sometimes as the result of the professor heading off on a tangent and not offering a satisfactory explanation.
 - a. These question marks are dangerous. As Christine from Harvard puts it, by skipping a point made in a lecture, “you’re gambling with the possibility of being truly in the dark on the exam.” The scenario is simple. During the semester a few topics slip past your attention in class, so you end up with a handful of question marks in your notes. When it comes time to study, you have more than enough big ideas that you do understand, and that you need to review, so the occasional question- marked topic gets ignored. You enter the exam feeling prepared, and then, as luck would have it, you find yourself face-to-face with a big essay question covering one of those bypassed concepts. *Whoops*. To prevent this from happening, you need to eliminate these question marks. **The key is to start this process well before the exam.**
 - b. If you leave all of these question marks unanswered until you start studying, you will end up spending many extra hours looking up the required explanations. Learning a large quantity of material from scratch during the review process is a mistake made by average students—and you should avoid this.
 - c. Instead, try to knock off question marks as soon as they arrive.
- II. **Step 2: Ask questions during class.**
 - a. When in doubt, I just ask questions in class for more clarification, explains Worasom from Brown. If a topic slides by you, raise your hand and ask for a clarification. The more question marks you eliminate on the spot, the less work you will have to do later.

III. Step 3: Develop the habit of talking to your professor briefly after class.

- a. Talk to the professor after class, or send him an e-mail asking for clarification about questions that arose during his lecture,
- b. When the class ends, head over to the professor and see how many of the question marks of the day you can get eliminated.
- c. You should then immediately correct your notes before you forget the explanations.

IV. Step 4: Come prepared to exam review sessions (if offered).

- a. Many classes offer a formal review session the week before the exam.
- b. Before you arrive, jot down all of the topics from your notes that you are still unsure about.
- c. During the session try to get all the answers

V. Step 5: Despite your best attempts, some of these unclear topics persist until your review, your last-ditch defense is to skim. You probably won't have time at this point to look up detailed explanations from scratch for every leftover question mark. Skim over just enough material to have *something* to say for each of these points.

Step 6- Provide “A+” Answers (Take Test, Exam and Write Essay) Steps and Strategy

- **Provide ‘A+’ Answers**

- I. Strategy 1: Review First, Answer Questions Later.**

- a. Step 1: Read, Review and Scan All questions of the entire exam.**

If it's an essay exam or a technical exam with a relatively small number of questions, then read each prompt carefully. If the exam is multiple choice or contains many questions, skim through quickly and get a feel for which topics are covered. This review familiarizes you with the length and relative difficulty of the exam.

- This allows your mind to think about all of them, even while you are focusing on one in particular.” In other words, while you toil away on an early question, another part of your brain, working in the background, will begin to retrieve information relating to the topics still to come. This actually happens, and it helps you answer the later questions more quickly.

II. Strategy 2: Build A Time Budget

- a. Step 1: As the exam taker, you need to know the maximum number of minutes this exam will be.
- b. Step 2: Calculate number of minutes, how long will I have to spend on each question. This strategy goes a long way toward avoiding time trouble; it keeps your attention focused and prevents you from spending too much time on any particular question.
 - Exam with high number of Questions
 - First, take the time allotted for the exam and subtract ten minutes.
 - Next, divide this amount by the number of questions. The result is how long you have to spend on each prompt.
 - For an exam with many questions, divide the exam into equal fourths, then jot down the time you should begin and end each section.
 - Exam with small number of questions
 - First, take the time allotted for the exam and subtract ten minutes.
 - Next, divide this amount by the number of questions. The result is how long you have to spend on each prompt.
 - For an exam with a small number of questions, mark right on the test pages the time when you should begin and finish each one.
 - In both cases, these recorded times will keep you updated on how close your current progress matches your predetermined schedule.
 - Why do we subtract ten minutes in the first step? This provides a safety buffer. You want a few extra minutes available here and there to be able to double check your

answers when you are finished, or go back and add more insights to questions on which you were rushed.

III. Strategy 3: Proceed From Easy to Hard

- a. Step 1: Straight-A students almost never answer exam questions in the order that they are presented. Years of informal experimentation by successful students have demonstrated that the most effective way to tackle an exam is to answer the easiest questions first, and this is exactly what you should do. Start with the most approachable questions before moving on to the more forbidding.
 - Don't worry if this has you skipping around all over the exam—in most cases the provided order is irrelevant.
- b. Step 2: The advantage of this approach is that it first focuses your energy on the questions you know the most about, ensuring that you get maximum points on these. It also gives you a better chance of conquering the more difficult ones. "I always skip a question if it does not come to me immediately," explains Ryan from Dartmouth. "This keeps my mind clear to answer other questions and hopefully something will jog my memory."
 - When you come across something hard early on in the exam, your natural instinct is to panic. You have so many more questions to finish, and you can almost feel the minutes ticking away as you stare blankly at this one particular roadblock. It can be tough to get your focus back to wring out as many points as possible from the easier questions that follow
- c. Step 3: If, instead, you tackle this same roadblock at the end of the exam, you'll find that the situation seems less dire. You've answered everything else, so all that's left to do is working out this final puzzler. More often than not, you will find the mental block diminished. Without the pressure of other questions looming in the background, you can take a more relaxed

approach. You might not know the *best* answer, but you can spend some time to devise a *reasonable* answer. Because you have nothing else left to finish, you can spend the remainder of the time polishing this answer, thinking, and repolishing. The result is the strongest possible outcome given your state of preparation.

Answer the Easiest Questions First

Another strategy for improving your grade on an exam is to answer the easiest questions first. By immediately answering all of the questions that you know, you can maximize your score on the test. If you do run out of time, you'll be sure to receive points for the questions that you did know. In addition, you can reduce your test anxiety by answering the easiest questions first. By the time you go back to work on the more difficult questions, you'll feel more relaxed. This is because you build up your confidence as you complete the easy questions; you know that you know at least some or even many of the answers. One student reported that she used this strategy on an algebra exam. By the time she went back to the "difficult" questions, they didn't seem nearly as hard. Because she was more relaxed, she was able to think through the problems more logically and solve them correctly.

Some students panic if they read the first question on the test and realize they don't know the answer. Instead of allowing yourself to start thinking negative thoughts, just tell yourself "This is a hard question—I'll come back to it later." This type of positive thinking allows you to stay calm and focus on the rest of the test.

Work Strategically to Answer All Questions

As you move through the exam, skip the questions you aren't sure of and go on to the easier questions. If you know that you don't know an answer, don't spend a lot of time on the question. Mark the questions you skip by putting a dash or question mark in the margin or by circling the number. After you complete the rest of the test, go back to them. (If you're using an answer sheet, be sure you skip the same spaces there, too.) When you return to the questions you skipped, try to figure out the answers strategically. Think through each question. Underline key words in the question to focus your thinking. Eliminate any answer that you know is wrong and then try to figure out the correct answer. Do a **memory search** to try to retrieve the information about the topic. Ask yourself questions about the material. Try to determine whether the answer came from the lecture or from the text. Try to remember where you saw it on the page, where it was written in your notes or study sheets, or what the professor was talking about just before or after that topic was presented. By searching your memory, you may be able to find a clue or cue that helps you recall the information.

Guess Strategically

Even if you're well prepared for a test and use good test-taking strategies, you still may find that you can't answer some questions. When none of your test-taking strategies work, then you should guess. Let's say there are four questions that you can't figure out on a fifty-item multiple-choice test. Because each of those questions is worth 2 points, your unanswered questions add up to 8 points or almost one letter grade. Not answering them will result in at least an 8-point loss in your grade. Guessing doesn't guarantee that you'll get all of the questions right, but it certainly improves your odds of getting some of them right.

What is a guess anyway? Some students describe a guess as just putting down any letter they can think of to fill the slot. They choose randomly from among the alternatives. However, **strategic guessing** involves more active processes. There are a number of strategies that you can use to pick up a few more points on a test even when you don't know the correct answer.

Rule 1: Be well prepared. Unless you are well prepared for an exam, strategic guessing will not work. You can't use these strategies unless you already know a lot of the answers.

Look for Patterns

After you answer all the easy questions on an exam and use problem-solving strategies to figure out the answers for a few more, you may still have a few you don't know.

Rule 2: Don't guess as you go. If you guess on questions that you don't know as you move through the exam, you won't see the patterns emerge.

Rather than just guessing randomly, look for patterns in the answers. Many professors never use the same letter more than two or three times in a row before shifting to a different response. So if you know that B is the correct response for the three previous questions and you eliminated C and D, A would be a more strategic guess than B. Go back and look at some of your old exams to see what types of patterns your professors use. You may find that your professor tends to use more false statements on true/false tests or more D answers on multiple-choice items. If you have five or six blanks at the end of the test, you could mark them all false or all D (assuming you didn't already eliminate D as a wrong answer). Although you won't get all of the questions right, you should be able to get at least a few of the answers right—adding several points to your total test score.

Rule 3: Eliminate wrong answers. Even if you don't know the correct answer to one of the questions, you may know that some of the answers are incorrect. If you eliminate wrong answers, you will increase your odds of guessing the correct answer.

Problem-Solving Strategies

Problem-solving strategies can help you logically and methodically identify the correct answer even if you don't know it when you first read the question.

- 1. Read the question and all answers before you select the “correct” answer.**
Some students lose points on multiple-choice exams because they don't read all possible answers before selecting the one that they think is correct. Many times the first or second alternative may appear to be the correct answer, but one of the other answers may in fact be an even better choice. In most multiple-choice tests, you generally are asked to select the *best* answer. In that case, several of the choices may be correct or good answers, but only one answer is the “best” answer.
- 2. Underline key words.** By underlining key words in the question, you can better focus your attention on what's being asked. In addition, you may find that underlining key words helps you identify a cue that triggers your long-term memory. Finally, taking the time to underline key words in both the question and the possible answers forces you to slow down and read the question and answers more carefully. If you rush through the test, you may misread questions or answers. You may make careless errors that cost you points you should have had.
- 3. Work to eliminate incorrect alternatives rather than looking for the “right” answer.** After reading the question and all alternatives, begin looking for those that you know are wrong. When you're sure that one possible answer is a **distractor** (incorrect answer designed to appear correct), cross it off. Continue eliminating choices until only one answer remains. If you can eliminate all alternatives except one, you know you've found the correct answer.
- 4. Connect the stem of the question to each alternative answer; then treat each statement as a true/false item.** In a way, all multiple-choice exams are really composed of a series of true/false items. If you're good at taking true/false tests, use the same strategies that work for you on the true/false items for the multiple-choice items. Identify key words, underline words or phrases that make the statement false, and watch for absolute, qualifying, and negative words (discussed in the next section). By examining each alternative as a separate statement, you will be able to improve your test score.

5. **Read the question, cover the alternatives, and think of the answer.** Some students find multiple-choice tests difficult because they allow the distractors to confuse them. Some professors are so good at writing distractors that, even if you know the correct answer, you begin to have doubts about it after reading the alternatives. To avoid this problem, cover the answers with your hand, read the question, and think of the answer. Then read each alternative and ask yourself, “Does this mean the same thing as the answer that I know is correct?” This strategy is especially effective when the question is written at the comprehension level. In this situation, the information is rephrased or put in different words. By comparing your answer to each of those listed, you should be able to identify the correct choice.
6. **Use caution when “all of the above” and “none of the above” are included as choices.** If you can eliminate even *one* alternative, you can eliminate “all of the above” as the correct answer. Similarly, if you’re sure that at least one choice is correct, you can eliminate “none of the above.” If you have three alternatives and you know that two of them are correct but aren’t sure of the third, “all of the above” must be correct (assuming you can choose only one answer). If “all of

Test-Wise Strategies

Use test-wise strategies to help you determine the correct choice when you can't figure it out. Many courses that are designed to prepare students to take the SATs or other standardized tests seem to specialize in these "test-smart" strategies. Some of them are very helpful; others are not so useful. The key to using these strategies is to use them sparingly. Never follow a test-wise strategy that would require you to select one alternative when you are fairly sure that another alternative is the correct answer. Use these strategies only when you can't determine the correct answer by using the more conventional strategies.

Some of the more effective and useful test-wise strategies follow. Use them to answer the multiple-choice questions that follow each tip. You aren't expected to *know* the correct answers, but rather to figure them out by following the test-wise strategy. The correct answers are at the end of the chapter.

1. An answer that contains more specific, detailed information probably is correct. Vague or general alternatives are often used as distractors.

According to studies on alcohol consumption,

- a. young people drink more than they used to.
- b. Americans drink more than ever.
- c. as many as 23 percent of all young people between the ages of twelve and eighteen have a serious drinking problem.
- d. drinking has filtered down to preteen groups.

2. An answer that contains the most words, especially if it also contains the most specific information, probably is correct.

Depressants may be defined as

- a. downers.
- b. sedatives, substances that reduce the activity of the brain and muscles.
- c. drugs that increase alertness.
- d. none of the above.

Strategies for True/False Tests

Many students like true/false tests because they provide excellent odds for guessing correctly. However, some students have difficulty dealing with this type of test because the statements can be tricky. To make a statement incorrect, professors may change key words, omit key words, add absolute or negative words, add extraneous information, and so on. Because there are so many ways to make a statement “false,” students must consider all of them as they examine each statement.

Use the following basic guidelines when taking true/false tests:

- 1. Always read the directions before beginning a true/false test.** Some instructors are very particular about how they expect students to mark true/false items. If you don’t complete the exam according to the directions, you may not get credit for your answers.
- 2. For a statement to be true, it must be all true.** If any part of the statement is false, the entire statement is false. Even if a statement is composed of two or three parts or entire sentences, if one part or even one word is incorrect, the entire statement is false.

EXAMPLE:

True or False To do well on college exams, you must become actively involved with the material, which can be accomplished by reading over the material several times.

The correct answer is *false*. Even though the first part of the statement is correct, the second part is not.

- 3. True/false items are not all tricky.** Some students start to look for “tricks” or read too much into the question when a true/false item seems “too easy.” If you’re properly prepared for a test, some true/false items should appear to be easy.

EXAMPLE:

True or False Knowledge-level questions require only rote memory.

- 4. Identify the key words or phrases.** Many professors make a statement false by substituting another word or phrase for the correct one. Which words are the key words in examples (2) and (3)? In example (2), the words *actively involved* and *reading over* are the most important words. In example (3), the key words are *Knowledge-level* and *rote memory*. By identifying and verifying the accuracy of key words, you can more easily decide whether a statement is true or false. What are the key words in the following statement?

EXAMPLE:

True or False Application-level questions involve a rephrasing of the information that you learned.

- 5. Statements that contain absolute words are usually false.** Words like *always*, *all*, *none*, *never*, *only*, *every*, and *no* are examples of **absolute words**. Each of these words implies that there are no exceptions. Although the inclusion of these words in a true/false item does not guarantee that it's false, it usually indicates a false statement. In fact, other than changing one or more key words in the statement, this is one of the most common ways to turn a true statement into a false one.

EXAMPLES:

True or False All adults are auditory learners.

True or False Students should always study by reciting out loud.

True or False You should never study more than two chapters on the same day.

- 6. Statements that contain qualifying words are usually true statements.** Words like *usually, often, may, can, sometimes, frequently, rarely, most, some, many, few, and generally* are examples of **qualifying words**. These words qualify or “temper” the statement to allow for exceptions and are generally associated with true statements. However, if you *know* that a statement is false, mark it *false*, even though it contains a qualifying word.

EXAMPLES:

True or False Some adults are auditory learners.

True or False Reciting out loud is often a good study strategy.

True or False You should rarely study more than two chapters on the same day.

- 7. Statements that contain negative words often are tricky and require careful attention.** Double negatives, which generally include the word *not* plus another word that contains a negative prefix, such as *incoherent, illogical, irresponsible, unhelpful*, and so on, often confuse students. If a statement contains a double negative, cross off the word *not* and the negative prefix (*in, il, ir, or un*) and then reread the statement to determine whether it’s true or false.

EXAMPLE:

True or False It is not illegal to smoke in the dormitory rooms on this college campus.

By eliminating the negative words, the statement becomes: It is legal to smoke in the dormitory rooms on this college campus.

- 8. Always underline the word or words that make a statement false.** If you can't identify and mark the actual key words, absolute words, qualifiers, and so on that cause the statement to be incorrect, assume that it is correct and mark it true. There is one exception, however. If you know that a statement is false by omission (because a key word or phrase has been left out), mark the statement *false* even though you can't actually underline the words that make it false.

EXAMPLES:

True or False You can improve your test scores by using the Seven-Day Study Plan that was recommended in the text.

True or False If you learn information to the recognition level of learning, you can think of the answer without additional cues.

True or False Word cards should be made up for technical terms and names of people.

Although the last item is true, some students might wonder whether it implies that word cards should be used *only* for these two types of information. According to the text, you can use word cards for many other types of material, including dates, events, theories, and formulas. Some students might think that the third example therefore is false by omission. In instances like this one, you should ask the professor whether he or she means that these are the *only* uses of word cards.

- 9. Correct all false items on the exam if you have time to do so.** By correcting the statement, you show the professor, and remind yourself, what you were thinking during the exam. (By the time you get the exam back, you may not remember why you thought the item was false.) Use this strategy only when you have plenty of time to complete the test or if you can make the correction quickly.

You might correct each of the statements in example (8) by crossing out the incorrect words and substituting or adding:

Five-Day Study Plan

recall level

to learn terms, names, dates, events, theories, formulas, and so on

- 10. Many professors include more true items than false items on an exam.** Many professors use tests to reinforce the main ideas that were presented in the course. If you absolutely can't figure out whether a statement is true or false, mark it true. Watch for patterns on each test.

❑ **Don't leave the exam early.** Some students rush through the exam because they are afraid of running out of time. Others begin to panic as soon as the first student turns in his or her paper. You need to use all of the exam time to get the best grade you can. You may be able to pick up a few more points by using problem-solving strategies, test-wise clues, and guessing strategies.

❑ **Go back over difficult questions.** Use any additional time to rethink difficult questions on the exam. Underline key words in the question and in the alternatives. Eliminate wrong answers. Look for clues in other questions. Rephrase the question or the alternatives.

❑ **Redo math problems to check your work.** Some students lose points on exams because of careless errors. If you have time, cover the problem with your hand and rework it. Then compare your answers. If they differ, check your work line by line until you locate your mistake.

❑ **Do a memory search.** When you can't figure out the answer to a question, try doing a memory search. Ask yourself whether the information was presented during the lecture or if it came from the text. Try to figure out from which topic the question came. Sometimes you can trigger a cue to long-term memory by identifying where or when you studied it.

❑ **Use caution when changing answers.** During a final review of the test, many students change answers because they start to have second thoughts about their original choices. This strategy often leads to changing correct answers to incorrect ones. Instead, use this rule: Don't change an answer unless you find that you misread the

question or actually find the correct answer or a clue to it somewhere else on the exam.

❑ **Review the entire exam.** When you complete the exam, take a few minutes to go back over it and check your answers. Some students make careless errors when they begin the exam because they're anxious; others do the same toward the end of the exam when they think they're running out of time. By reviewing your test, you may be able to correct some careless mistakes that would have cost you valuable points.

❑ **Code your test.** If you have time, put a line through the letters of answers that you eliminate. Circle the letter of the answer that you select and leave blank the letters of any answers that you aren't sure about. After the exam is over, you can see how effectively you were able to eliminate wrong answers. You should also put a dot next to the answer when you guess. You can monitor your guessing ability after the exam, too, by **coding your answers**.

❑ **Check your answer sheet against your exam.** Before you turn in your test paper, take a minute or two to check to be sure that you marked the correct answers on your answer sheet. It's easy to make mistakes when you're nervous or in a hurry. You want to get the points for all your correct answers.

❑ **Estimate your grade.** Before leaving the exam, take a few minutes to estimate your grade. Learning to accurately predict your test score can help you eliminate feelings of panic that often occur after taking the exam. Some students become so nervous about the outcome of an exam that it interferes with their ability to concentrate on other work.

Microso

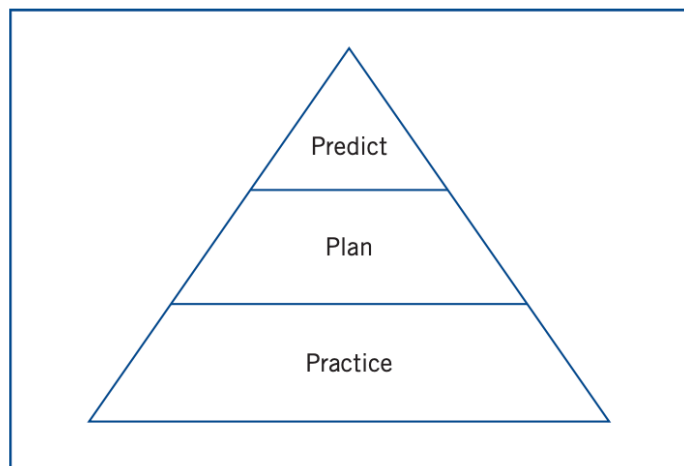
IV. Strategy 4: Outline Essays

- a. Step 1: When facing an essay question, don't just start writing and see what happens.
- b. Step 2: First, reread the question carefully
- c. Step 3: Write down a quick outline.
 - Usually, you can isolate three or four mini-questions from a single essay question.
 - Underline each of these mini-questions; this will help you flesh out your outline and avoid an incomplete answer.
 - Then, outline on paper (not in your head) the way that you will use what you know to answer these mini-questions,
- d. Step 4: Use the margin of the exam to jot down all of the points you can recall that are relevant to the question. Record only a few key words for each point to save time and space. For example, if you want to mention an argument made by an author named Robert Caro dealing with Lyndon Johnson's views on race relations, you might jot down: "Caro—race.
- e. Step 5: Next, go back and check the question parts you underlined in the first step. Make sure each is adequately addressed by the points you just noted in the margin. When you're sure that you have identified all the relevant information for the essay, number these points in the order that you want to present them.
- f. Step 6: Now should you begin writing your essay. Follow your outline, and the writing will proceed smoothly. You should be able to quickly produce a solid response that draws on everything you reviewed and addresses all parts of the question asked.

ESSAY PREPARATION STRATEGIES

Essay exams are more difficult than objective exams for many students because they require recall learning. You need to *know* what you're writing about. To prepare for an essay exam, you should use many of the strategies presented in Chapter 10 for setting up a study plan and learning the material. Preparing for an essay exam, though, involves more than just knowing the material. To write a good essay answer, you need to be able to organize your thoughts and ideas rapidly and then present them in a well-developed and well-written form. All these skills require training and practice. In this chapter you'll learn some additional strategies for preparing for essay exams. Predicting, planning, and practicing your own questions and answers before the exam can help you improve your performance on essay exams. (See Figure 12.1.)

FIGURE 12.1
Three Steps to Preparing for
an Essay Exam



Predict Questions

If you're not given the actual questions that will be on the exam, then the best way to study for an essay exam is to predict test questions yourself. By anticipating questions that could be on the exam, you increase your chances of studying the same information on which you'll be tested. Of course, it's also to your advantage to prepare the answers in essay form so that you study the information in the same format that you'll be required to use on the exam. A good rule of thumb is to predict at least four to five times the number of questions that will be on the exam. If you'll have to answer two essay questions on the exam, then you should predict eight to ten questions. Another approach is to predict three or four questions from each chapter. This is especially effective if you have only one essay question to answer. The more questions you predict, the greater your chances of accurately predicting the questions on the exam. Also, even if you don't predict the exact questions, you may find that you've predicted a question similar to the one on the exam. In the process of preparing to answer your question, you may learn the information that you need to answer the question that the professor asks. The more questions that you predict, the better you'll do on the exam.

You should predict broad, challenging questions if the exam will cover large amounts of material. If the essay exam will include ten questions on only two chapters of text, however, the questions may be more specific and require more detail about a specific topic. If you're well prepared to answer broad questions, you should be able to answer the specific questions, too. Study guides (purchased guides or study guides provided by the professor), major topics in your lecture notes, and end-of-chapter questions in the text are valuable sources of essay questions. Asking the professor for sample questions and reviewing old exams can help you determine the types of questions that you should be predicting.

Narrow questions that focus on why or how something happened often are too limited in scope. Most essay questions ask you to discuss causes and effects, compare and contrast, explain the steps in a process, and so on. You'll be able to predict and answer essay questions more effectively if you understand the terms that commonly are used in essay questions. A chart of frequently used terms is presented in Figure 12.2. Although you don't need to memorize the terms and their definitions, you should become familiar with them.

FIGURE 12.2
Frequently Used Terms in
Essay Questions

Term	Definition
compare	Tell how two or more subjects are alike; provide similarities. Some professors also expect you to discuss differences—ask.
contrast	Tell how two or more subjects are different.
define	Give the meaning or definition.
describe	Provide details or characteristics about a subject.
discuss or explain	Give a detailed answer that may include definitions, main and supporting points, reasons, and examples.
evaluate	Discuss both positive and negative aspects of the topic and then make a judgment.
illustrate	Explain by giving examples.
justify	Prove by giving evidence that backs up or supports a point.
list or enumerate	Number and list the information rather than writing in paragraph form.
summarize	Provide a brief review of the main points.
trace	Describe the events or steps in order of occurrence.

Gather Information

An easy way to gather information is to treat each question separately. Write each question across the top of a large piece of paper. Then open your text and your notes to that section of the material. Start to look for information that you would

FIGURE 12.4
Addie's Gathered Information

	What are the stages in the evolution and growth of American cities?	
	From beginning to about 1800s (T)	Urban population swelled (T)
	Manifest Destiny (L)	Industrialization continued after Civil War (T)
	Cities grew and developed (T)	1860s to World War I (T)
	The Great Depression (L)	Urban decay (L)
	Suburbs grew and flourished (T)	SMSAs became MSAs (T)
	NYC became national metropolis (L)	Construction of canals and
	1800 to 1860s (T)	railroads (L)
	Cities served as outposts of	World War I to World War II (L)
	Western Europe (T)	Development of coastal cities (T)
	Returning veterans (L)	Northeastern cities developed as
	Cities developed before commercial	industrial centers (T)
	agriculture (L)	Post World War II (T)
	Programs instituted by Pres. F.D.R. to	9,000 banks closed losing
	help the unemployed (T)	\$2.5 billion (L)

use if you had to answer the question. Pretend that it's an open-book exam and you have the opportunity to look for the material that you're going to use. As you locate important points and details that would be useful in answering the question, write them down on your sheet of paper. Don't copy the information; rather, write it in meaningful phrases. If you use a two-column format, you'll be forced to condense the material. Afterward, outline your answer.

Addie listed the information from her textbook and lecture notes. Figure 12.4 shows the information Addie gathered for the essay question that she predicted would be on her History exam. As you can see, this list of information is still far from the organized essay answer that you need to write. There are many ways to arrange the information that you pull from your text and notes. Some students prefer to organize the information as they gather it. Many students find, though, that it's too difficult to jump directly to the outlined answer. In the next section, you'll learn how to organize and outline your essay answer.

Organize Information

After gathering information for a number of questions, you may find that you have a huge amount of information to remember. By organizing the information for each question, you'll find it is easier to learn and remember the points you want to make for each question.

You can organize your gathered information by *labeling* each point. Look at each piece of information that you wrote down and decide where it should go in

What are the stages in the evolution and growth of American cities?

- | | |
|--|---|
| 1 From beginning to about 1800s (T) (L) | 5D Urban population swelled (T) |
| 2A Manifest Destiny (L) | 3A Industrialization continued after Civil War (T) |
| 3B Cities grew and developed (T) | 3 1860s to World War I (T) |
| 4A The Great Depression (L) | 4C Urban decay (L) |
| 5B Suburbs grew and flourished (T) | 5C SMSAs became MSAs (T) |
| 2C NYC became national metropolis (L) | 2B Construction of canals and
railroads (L) |
| 2 1800 to 1860s (T) | 4 World War I to World War II (L) |
| 1B Cities served as outposts of
Western Europe (T) | 1C Development of coastal cities (T) |
| 5A Returning veterans (L) | 2D Northeastern cities developed as
industrial centers (T) |
| 1A Cities developed before commercial
agriculture (L) | 5 Post World War II (T) |
| 4D Programs instituted by Pres. F.D.R. to
help the unemployed (T) | 4B 9,000 banks closed losing
\$2.5 billion (L) |

your essay. Find the point that you want to make first and label it 1. Any points that support it should be marked 1A, 1B, and so on. After you organize the information, you may find that you don't have any supporting points for some of your main points or too few for others. You can go back to your text or lecture notes and dig for more support. An excellent way to organize your essay notes is shown in Figure 12.5. Does Addie have sufficient support for each of her main points?

Outline Your Answer

Although Addie did organize her information (Figure 12.5), it still is not in a form that's easy to practice and remember. An informal outline is much more useful for remembering the points that you want to make in your essay answer. The easiest way to outline your answer is simply to list the **main points** (the points that directly answer the question) next to the margin and then list the **supporting details** (the facts, details, or examples that support each main point) indented slightly underneath. Try to limit your main points to seven or fewer so you can remember them. Three or four main points with good support for each should be sufficient for most answers. Of course, if you need to know the five causes of something, then you'll have five main points.

Look at the outline that Addie developed from the information that she gathered (Figure 12.6). Addie used an **informal outline** style in which she listed main points and then indented the secondary or supporting points.

FIGURE 12.6
Addie's Informal Outline

●	From beginning to about 1800s
	Cities developed before commercial agriculture
	Cities served as outposts of Western Europe
	Development of coastal cities
	1800 to 1860s
	Manifest Destiny
	Construction of canals and railroads
	NYC became national metropolis
	Northeastern cities as industrial centers
	1860s to World War I
	Industrialization continued after Civil War
	Cities grew and developed
●	World War I to World War II
	The Great Depression
	9,000 banks closed losing \$2.5 billion
	Urban decay
	Programs instituted by Pres. F.D.R. to help urban unemployed
	Post World War II
	Returning veterans
	Suburbs grew and flourished
	SMSAs became MSAs
	Urban population swelled

Practice the Answers

Gathering, organizing, and outlining the information that you would use to answer a question doesn't guarantee that you'll be able to replicate the answer on the test. The next step is to practice your answer. By learning the key points, you increase your chances of maximizing your score on the exam. It's not necessary to memorize your outline word for word. Practicing the main points and details in your outline should help you learn the answers to your predicted questions.

Practice Your Outline

Identify the main points in your outline and then learn them. The best way to learn the main points is to practice them over and over. Cover everything except the question with your hand or another sheet of paper. Ask yourself, "What are the main points that I want to make about this question?" Even better, try to write your outline without looking back. Practicing (reciting and writing) the information over a period of days will help you remember it during the exam. Once you know the main points, practice the details in your outline. Each of the main points can then serve as a cue to help you recall the details.

Use Mnemonics to Aid Recall

If you have difficulty recalling certain points or remembering them in order, try using a **mnemonic device** (a memory cue) to improve your recall. Identify a key word in each of the main points that you made in your outline. Underline the

key words and then think of a way to remember them. Acrostics or catchphrases are useful for essay tests because they allow you to recall the information in order. Although these mnemonics don't replace learning the information, they do act as hooks or cues to help you recall what you learned. Lisa created the catchphrase, "Nancy sells every car for parts," to help her remember the six main points for her sociology answer (Figure 12.7).

FIGURE 12.7

Lisa's Gathered Information
and Outline with Mnemonic
Cues

	Explain the view Thomas Hobbes took on the problem of order and the social contract.
●	1 social order is political natural law 2 state of nature 2A people are selfish and violent 2C people become power hungry 2B central concept is power 3A state of nature is condition of war 3B common fear of power 3 equality among people 4 people form a social contract 4A agreement b/w societies 4B people give up natural liberty 4C laws tell us how to act 5 if we break laws we are denied freedom 6 power of state is order
	TS Thomas Hobbes viewed order in society as a hunger for power among people.
●	1. Social order is political <u>natural</u> law 2. <u>State</u> of nature A. people are selfish & violent B. central concept is power C. people become power hungry 3. <u>Equality</u> among people A. State of nature is condition of war B. Common fear of power 4. People form a social <u>contract</u> A. agreement b/w societies B. people give up natural liberty C. laws tell us how to act

1. Natural

2. State

3. Equality

4. Contract

5. Freedom

6. Power

(Nancy sells every car for parts.)

Write Out Some Answers

Some students know how to answer a question; they know the information. However, when they actually are in the testing situation, they just can't seem to put that information on paper. If this has happened to you before, the problem may be about writing rather than about studying. To convincingly show the professor what you know, you need to practice writing out some of the answers in paragraph form.

Practice writing your answer by referring to your outline. Your goal here is not to test your memory of the information but to practice stringing together your ideas. Turn each line from your outline (each meaningful phrase) into a sentence. Add additional sentences to provide more details, if you can. After you've successfully constructed an

answer with the outline, try to write the answer again without it. On the evening before the exam, practice writing the answer one last time. By allowing yourself some time between your initial practice session and your final one, you test your ability both to recall the information and to present it in a well-written and well-organized manner.

If you've predicted a large number of questions, you may not have time to write out all the answers ahead of time. If this happens, write out only the ones that you think you would have the greatest difficulty explaining. If a number of your questions seem fairly straightforward, you can probably eliminate this stage. Just be sure you review aloud the key points that you would make and think about how you might start the answers. Choose more complex questions for written practice. If you can present the information in the difficult questions in a well-written form, you probably can do equally well or better on the easier questions.

TIP**Ten Tips for Preparing for Essay Exams**

- ❑ **Prepare all sample questions.** If your instructor gives you sample essay questions, prepare an essay plan for each one. Often the same, or very similar, questions are used on the exam. By preparing each of those answers, you will also cover most of the major topics on the exam. Don't forget to predict your own questions, too.
- ❑ **Review old exams.** Review old exams to get some ideas about the types of questions your professor tends to ask. Don't rely just on those questions, though, because few professors use the same questions over again. Use them, instead, as models to develop your own questions.
- ❑ **Predict your own test questions.** Go through your text and lecture material and write eight to ten essay questions that you think could be on the exam. The more questions you write, the greater the possibility several of your questions will be on the exam.
- ❑ **Plan the answers to your questions.** Dig through the text and lecture material to find the information that you need to answer the questions that you predicted. Write the information on a sheet of paper and think about how you might use it to answer the question. Share your plans with members of your group.
- ❑ **Develop an informal outline.** Organize your gathered information in an informal outline so that you can easily see the main points that you want to make when writing out your essay answer. List the main points of your answer and then several of the details in your outline. Keep your outline simple so that it's easy to recall.
- ❑ **Recite the main points of your answer.** Practice reciting the main points that you want to make for each of the answers that you developed. While you're driving to school or work, check your memory of the information. Just creating an outline doesn't mean you know the information.
- ❑ **Use mnemonics to aid your retention.** Developing catchwords and catchphrases can help you recall the main points in your sample essay answers (in your outline). Remember, mnemonics don't replace learning the information; they just help you get it back out of memory after you have learned it.
- ❑ **Set up a study group.** Some students find that working in a group is quite effective when preparing for essay exams. Compare your questions with those of the members of your study group or predict questions as a group. Other members of the group may find connections in the material that you hadn't considered.
- ❑ **Write and compare essay answers.** Ask each member of your study group to write out the answers to the several questions that were predicted in your study group. Then exchange answers during a group meeting and compare your answer to each of the answers written by the other members of your group.
- ❑ **Get some feedback on your answers.** If you really aren't sure about the quality of your essay answers, ask your professor to take a look at one or two of them. Your professor can give you valuable feedback on how well you are preparing for the exam and how well you are able to communicate what you know.

V. Strategy 5: Check Your Work

- a. Step 1: Give yourself 10-15 minutes before the end of the Test or exam.
- b. Step 2: Always check your answers. If you have extra time at the end of the exam (may you be so lucky), then follow Chris's advice and go back and check your work. You will be surprised by how many times this final review turns up a mistake in a technical problem or an important concept that you forgot to mention in an essay.
- c. Step 3: If, after your first round of review, you still have time left over, then go through and check again. If there is a problem you feel particularly shaky on, use this time to go over it in detail, augmenting the answer wherever appropriate. Don't worry about using carets and arrows to add in new phrases and facts to your essays, or to point out added steps in your technical problems. Neatness doesn't count on exams; it's the content that matters.
- d. Step 4: Double checking your work up to the last minute can make the difference between an above-average student and an academic star.

- Plan in Action (Technical Course)
 - a. **What is in the exam is written in syllabus.** Specifically, the exam will draw from all material covered up until last week.
 - b. **Marshal The resources:**
 - Define The Challenge:
 - Before you can conduct any meaningful studying, you must first define the scope of the exam. As Simon from Brown puts it: “You need to know what kind of information the professor wants you to know.” To accomplish this goal, answer the following questions:
 - Which lectures and reading assignments (or problem sets) are fair game?
 - What type of questions will there be, and how many of each? As Christine from Harvard explains: “It’s helpful to know in advance what *kind* of knowledge will be asked for on the exam—IDs, dates, broad syntheses of the texts’ major arguments?”
 - Is the exam open note or open book?
 - For a technical class, will formulas be provided or do they need to be memorized?
 - How much time will be available? Does the professor expect the exam to be easy to complete during the test period or a challenge?

- Construct Mega Problem Set
 - **Step 1**-Start a pile for each problem set that covers material that might appear on the exam.
 - **Step 2**-Next, you'll need to supplement each problem set with sample problems from your lecture notes. For each lecture relevant to the upcoming exam, do the following. In other words, this process transforms your problem sets into *mega-problem sets* by adding extra problems drawn from your lecture notes.
 - Match the lecture to the problem set that covers the same material.
 - Copy sample problems from these lecture notes onto a blank sheet of paper. You don't have to copy the steps or the answers, just the questions.
 - Label the blank sheet of paper with the date of the lecture. This will help you later figure out where these problems came from (and more important, where their answers can be found).
 - Fasten this sheet with a paper clip to the problem set you matched it to in step one.
 - **Step 3**-Finally, you must augment your mega-problem sets with *technical explanation questions*. What are these? For every major topic covered in a particular mega-problem set, jot down a question that asks you to explain the basics of the topic. For example, as Greta from Dartmouth recounts, in an "economics course, I would make study sheets and then add a general question such as: *what happens*

when a government increases spending and lowers interest rates?”

- **Step 4-** It's important that you add these technical explanation questions in addition to your regular sample problems, since they will reveal whether or not you understand the underlying concepts or if you've just memorized the steps for some particular problems.
- **Step 5-** One last note: If your professor makes a practice exam available, then print out a copy of it and store it with your mega-problem sets. For technical courses, sample exams are a great review tool, and you will definitely want to have them handy when it comes time to study.

- Prepare Memorization Aids
 - **To memorize: Formulas, Equations, Artwork, dates, chronologies. You may use the following aid:**
 - **Flash Cards-** Buy a stack of index cards, put the prompt on one side and the answer on the other. Constructing these flash cards, however, can take longer than you might imagine, so start early. If possible, start writing up your cards at least a week before the first day you plan to actually study. The activity is mindless—you can write flash cards while watching TV—so it shouldn't be too hard to get them done, in advance, bit by bit.
- Schedule Your Organisation Wisely
 - When you review, you want your brain at full power. If you organize your materials the same day that you review them, your brain will be too tired to accomplish both effectively.

- c. Extract sample problems from his notes to add to his existing graded problem sets. Following the strategy of Step #3, he grabs a blank sheet of paper for each of the four weeks of class. He then flips through his notebook and jots down sample problems from his notes onto the appropriate week's sheet of paper.
- d. Careful to label each question with the date of the lecture where he found it. This will make it easy to look up the answers in his notebook when it comes time to review. Finally, attach each sheet to the corresponding problem set.
- e. Final act of organization is to think up some technical discussion questions. For example, during the first week, Michael's class focused on single variable derivatives, so he jots down the following general question on his first mega-problem set:
"Explain what a derivative is, what it describes, and the general procedure for calculating one when given a function."
- f. Remember, these general explanation questions are crucial. Without them, you run the danger of memorizing specific problems but not learning the technique behind the problems, ill equipping you to handle the fresh problems you will face on the exam.

- I. Step 2: Three Days Before The Exam
 - a. Deep Work and Studying 2h before the start of the day.
 - Have a mindset trying to finish as much work as possible as early as possible.
 - b. Start the quiz-and-recall process.
 - c. Try to provide answers for each of the questions contained in the first mega-problem set.
 - d. Uses a sheet of scratch paper and forces himself to jot down the important steps to each problem. For the technical explanation questions, he actually paces up and down the stacks, lecturing about the topics under his breath.
 - e. After his first pass-through he takes a ten-minute break, then returns to tackle only the questions that gave him trouble.
 - f. Continue until successfully answered every question.

- II. Step 3: Two Days Before the Exam
 - a. Deep Work and Studying 2h in the morning
 - Concentrate on the third Mega problem set
 - b. Deep Work and Studying 2h in the afternoon
 - Concentrate on the fourth Mega problem set

- III. Step 4: One Day Before The Exam
 - a. Deep Work and Studying 2h in the morning.
 - Concentrate on the fourth Mega problem set
 - Go through his notes to retrieve the handful of question-marked topics that evaded his efforts.

IV. Step 5: Day of the Exam

- a. Refreshed and prepared, I would have found the experience a confidence booster and a final check for any techniques he might have missed in his systematic review.
- b. Deep Work and Studying 45 minutes for final review in the Morning.
- c. In the Exam:
 - Step 1: As the exam taker, you need to know the maximum number of minutes this exam will be.
 - Step 2: Calculate number of minutes, how long will I have to spend on each question. This strategy goes a long way toward avoiding time trouble; it keeps your attention focused and prevents you from spending too much time on any particular question.
 - Step 3: Proceed From Easy to Hard.
 - Step 4: Give yourself 10-15 minutes before the end of the Test or exam.
 - Step 6: Always check your answers.
 - Step 7: Double checking your work up to the last minute can make the difference between an above-average student and an academic star.

Step #1. Take Smart Notes

- Always go to class and try to take the best notes possible.
- For nontechnical courses, capture the big ideas by taking notes in the question/evidence/conclusion format.
- For technical courses, record as many sample problems and answers as possible.

Step #2. Demote Your Assignments

- Work a little bit each day on your assignments; avoid suffering from *day-before syndrome*.
- Read only the favored sources on the syllabus in detail. To decide how much time to spend on supplemental sources, remember the importance hierarchy:—readings that **make an argument** are more important than — readings that **describe an event or person**, which are more important than — readings that only **provide context** (i.e., speech transcripts, press clippings).
- Take reading notes in the question/evidence/conclusion format.
- Work in groups on problem sets, solve problems on the go, and write up your answers formally the first time.

Step #3. Marshal Your Resources

- Figure out exactly what the test will cover.
- Cluster your notes for nontechnical courses.
- Build mega-problem sets for technical courses.

Step #4. Conquer the Material

- Embrace the quiz-and-recall method. It's the single most efficient way to study.
- Spread out memorization over several days. Your mind can do only so much at a time.

Step #5. Invest in “Academic Disaster Insurance”

- Eliminate the question marks for topics covered in class or from the reading that you don't understand.

Step #6. Provide “A+” Answers

- Look over the whole test first. • Figure out how much time you have to spend on each question (leaving a ten-minute cushion at the end).
- Answer the questions in order of increasing difficulty.
- Write out a mini-outline before tackling an essay question.
- Use any and all leftover time to check and recheck your work.